DUPONT MAGAZINE

Vol.8 March 1918 No. 3

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On pleasure bent or at business, immaculate neckwear is no small asset. Soiled Challenge Cleanable Collars are made immaculate instantly. Dirt, perspiration, or weather have no terrors for them —off or on, jiffy cleanable. Every Challenge collar made with a stitch edge, dull domestic linen finish. 18 styles. No-wilt. Flexible. Peaks and buttonholes stoutly reinforced. Ever-white.

"Linen" collars with their constant laundering cost about $15.00 —Challenge Cleanable Collars less than $2.00 yearly. *Think it over.* Send 25 cents each for samples of several styles. State (half) size. Write today.

THE ARLINGTON WORKS

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DU PONT MAGAZINE

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Preparedness Through Advertising

George Frank Lord

Reprinted Through Courtesy of "Printers' Ink '

PREPAREDNESS for what?

Not for war, but for peace.

Never before has a lesson been more thoroughly taught than the lesson of preparedness as an essential to victory in any international undertaking.

This is a war of commercial competition. Such expressions as "a place in the sun" and "the freedom of the seas" are common, and refer to unrestricted commercial activity.

It must be obvious, therefore, that the war of artillery and torpedoes, on, under and over land and sea, is but the prelude for a more intensive and extensive contest for the commercial supremacy of the world.

Volumes have been written about the military unpreparedness of America, a condition due chiefly to our imagined security against foreign attack. But does anyone imagine that in the slightest degree we are immune against foreign commercial attack?

Yet, that is exactly what will follow the war in quality and quantity beyond all precedent. This, the wealthiest nation of the world, will be the Eldorado of impoverished Europe. We must expect and prepare for most aggressive competition, not only on the part of our war-time enemies, but also from our allies.

If, as most of the world prays, this war may prove the death knell of military conquest, all the ingenuity and efficiency of the civilized world and the half-civilized and barbaric as well, will be concentrated exclusively on commercial conquest.

It is well known that Germany has thoroughly organized her industries to recoup her war costs through world commerce. Our gallant allies, the French, have already sent commissions to this country to contract for machinery and tools to restore and improve her manufacturing facilities.

England has always been a world-trader, and her flag has ever pioneered in the hands of commercial organizations. These and other aggressive nations are bound to seek business in the mart where the money is, and that is the United States of America.

Shall we enter this century-long contest unprepared? Shall we dismantle our war-built plants, disband our highly efficient organizations, and retire our war surplus into impotent bank balances? Or shall we instead begin now to build up and expand our peace products to the end that when war ends, let us hope forever, we will be in position to utilize wartime facilities, war-time capital and war-time organization in the manufacture and sale of the materials and merchandise urgently needed by a devastated continent and a world that has been diverted from normal progress for years?

The latter decision seems so obvious that one is at a loss to realize how any farsighted business man can even hesitate in determining his course. The case of the Du Pont company is an extreme one, but its problem varies from thousands of others only in degree.

Contrary to general opinion, military sales are in normal times, a negligible factor of this business. The dependable business of a manufacturer of explosives is the sale of dynamite and blasting powder for industrial and agricultural purposes, and of sporting powder for hunting and trapshooting. But the war in Europe caused a sudden, enormous demand for American military explosives, successfully met by the Du Pont, and later, other concerns, through heroic effort, large investment in plants and equipment and the organization and training of thousands of workers. It is not too much to say that American efficiency in meeting this emergency saved the allies from utter rout in the first year of the war, and hence saved America from the projected attack following the expected fall of France, Russia and England.

This tremendous military business has supplied the Du Pont company with great chemical and mechanical plants, necessitated increased capitalization, the employment of thousands, and the creation of two cities.

What will happen to our sales possibilities when peace comes?

How will we earn dividends on the capitalization war requirements made necessary?

How may we fill the war plants with peace products and give peace employment to the thousands of skilled workers living in the war-built cities?

Surely not by wondering what *may happen* in business when peace comes, but rather by *making to happen*, what *must be* to employ these facilities.

We are now engaged in developing to maximum

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sale possibilities all our old-time peace products: dynamite, blasting powder, sporting powder, pyroxylin chemicals and leather substitutes. We are also entering new but related lines of business: the manufacture of Py-ra-lin, of paint and paint chemicals, of varnish, commercial acids, dyes, drugs and miscellaneous chemicals.

This development calls for extensive, continuous advertising to let all America and the buying world know that the Du Pont company, which they thought was chiefly a manufacturer of military explosives, is really the world's largest diversified industrial manufacturer producing more than a thousand peace commodities.

We are advertising not merely for current sales results, but for the development of future markets. Our advertising is institutional. We are less concerned with the sale of whatever illustrative commodities we may advertise than with selling the Du Pont oval, our trade-mark, and the big idea of Du Pont American industries, designed to play a most important part in the post-bellum development of America and the reconstruction of Europe.

Our advertising effort in 1918 will be double that of 1917, and we expect results will justify continued if not increased effort after 1918. In adopting this policy, we believe we are serving not merely the interests of our stockholders, but of the country, and that this service in commercial preparedness is second only to the service that we can render in helping to win the war.

We have no doubt that many other of America's business organizations will in like manner save permanently for American business the fleeting advantages gained through foreign war business.

This should mean an increasing volume of broad, constructive advertising that will forever establish with the American public America's ability to supply all our necessities, utilities and luxuries, and have plenty left over for the markets of the world

False Thrift

There is a lot of difference between thrift and parsimony. Conservation does not mean patched clothes, niggardliness in diet and curtailment of all expenditures to the absolutely indispensable necessities.

Thrift is essential, but not in the personal, penny-pinching way that many persons mistake for thrift. In war times, as always, we need amusement, the broadening that comes with educational advantages, and some things that, because they are not necessary to life, are commonly called luxuries.

Real conservation lies in the way of elimination of waste, the correction of uneconomic habits and a thorough investigation of costs.

It is not so much doing without things we have been accustomed to having that counts, as it is living so efficiently that we will not have to do without them.

False thrift—a mere curtailing of expenditures—saves nothing in the end. It merely disturbs the producing and distributing industries of the country at a time when they are, at best, passing through an unprecedented crisis.

Postponed expenditures usually cost more in the end. Living efficiently, cutting down waste, saving what was formerly spent without a fair return—that is real thrift.

Game Sanctuaries

The subject of game sanctuaries and their relation to conservation, discussed in this issue by Dr. Joseph Kalbfus, Secretary of the Game Commission of Pennsylvania, is of vital importance to everyone interested in the preservation of American game, whether from the standpoint of the naturalist or that of the hunter.

In some states fishermen have been known to turn the course of a trout stream, leaving the fish high and dry, and after taking as many as they wanted, leaving the rest to rot. This is possibly an extreme instance, but it illustrates the wasteful and unnecessary slaughter of game that has gone on for years in many parts of this country.

Now that the whole world faces a meat shortage, the needless killing of game cannot be permitted. If game sanctuaries similar to those in Pennsylvania were established on the waste lands of every state, it would go far toward meeting the food shortage, by providing an increased part of the meat ratio.

Every precaution should be taken to prevent the needless destruction of game of all sorts.

There is pressing need of protecting game from careless hunters and natural enemies.

Roads of the Future

While we have a very considerable mileage of so-called good roads in this country, it is an undoubted fact that the greater portion are not of a character to sustain successfully the heavy motor truck traffic that is now appearing on them, and which will certainly increase rapidly in the near future. To meet the new conditions steps should be at once taken to formulate a systematic plan not only to provide new roads, adapted to the new traffic, but to maintain them in operative condition. Provision should also be made for the rebuilding of much of the older mileage. What the nature of the construction of these new roads shall be is a matter for the engineers to solve, but there is no question but that there must be better drainage, better material and very much heavier foundations than have ordinarily prevailed in the past, especially as with smooth road surface the speed of these trucks is sure to be greatly increased. England has had her experience in this matter, for, what with heavy traffic added to lack of maintenance, on account of war necessities, there is hardly a main road in the country that is not utterly worn out, although they have been accustomed to build much more heavily than we have in the United States.—*Scientific American.*

PERSEVERANCE

By Leigh Mitchell Hodges

Perseverance is patience guided by purpose and propelled by human horse-power.

It plays no favorites.

With it poverty can be conquered and failure put to flight.

"Victory belongs to the most persevering," said Napoleon—and the man who proved this against him at Waterloo said, "Hard pounding, gentlemen: but we will see who can pound the longest."

When asked by a young man for a recipe for success, Bismarck replied: "You need three ingredients. The first is work. The second is work. And the third is work."

Perseverance is persistence in effort—keeping everlastingly at it with heart, mind and soul firm-set on the desired goal. It offers a free field, and for the man or woman who sticks, it holds out the highest rewards. The required qualities are daring, digging and discounting of doubts.

The common cause of failure is want of application. Each normal individual has within self the means of succeeding. Lack of sticktoitiveness is the father of failure. Yet so powerful is perseverance that when applied even to the most typical offspring of this parent, it can transform a corner-loafer into a corner-stone.

History bubbles over with brilliant examples of men and women who, thru perseverance, lifted themselves from unknown depths to heights of fame.

Without this quality Abraham Lincoln might have died as sheriff of Sangamon County, Illinois, and Thomas Gray, who spent twelve years on his "Elegy Written in a Country Churchyard," might never have got beyond the point of furnishing jingles to the local paper.

The person who thinks success a matter of luck or genius has another guess. Even Shakespeare, who began by holding horses in front of the old Globe Theatre, never could have reached the summit without perseverance.

The biggest and best thing about this quality, however, is its usefulness in the ordinary everyday, common-garden variety of life and labor. Just as the constant dropping of water will wear away the hardest granite, so continued effort will overcome any obstacle.

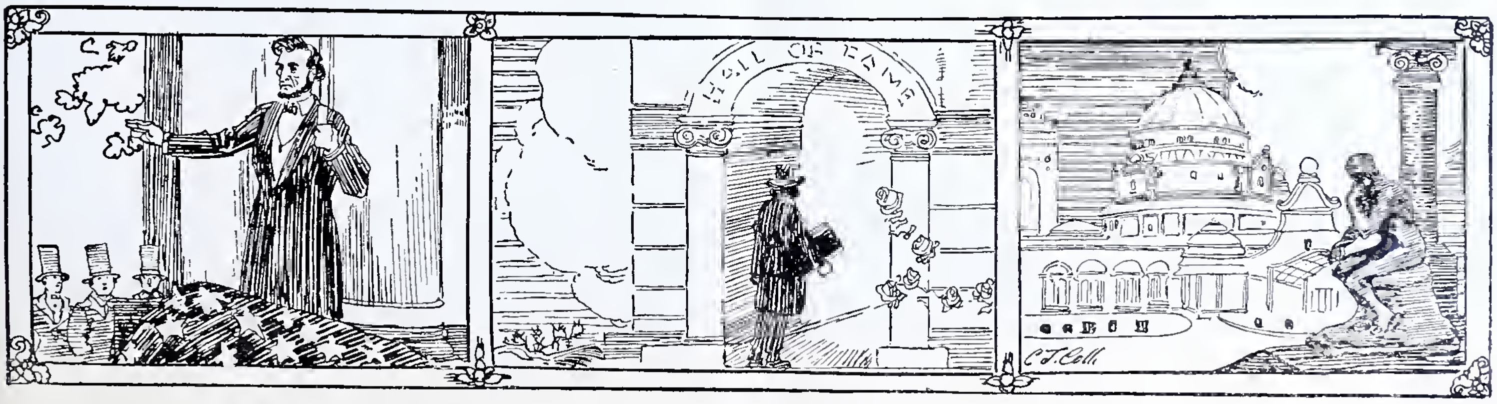
Old Dr. Johnson, sour as a crab-apple and superbly sane, emphasized this fact by saying, "He that shall walk with vigor three hours a day will pass in seven years a space equal to the circumference of the globe." This makes a man think.

What people have said about perseverance, interesting and inspiring as it may be, is not to be compared to what people can do thru perseverance.

Yes, I mean what YOU can do.

What you can do when you keep on after you have come to what may seem the limit of your powers, the end of your string.

And all perseverance means, in the last analysis, is keeping on. *However narrow or steep your path, it will pay you to personally prove this matter for yourself.*



Spring Time is Paint Time

THERE is something in the air in spring time that seems to say to us all "Come out of the kitchen—get ready for summer days—outside days." Even nature, as the first warm rays put to flight the last remaining patch of snow, seems to be tidying up her domain in preparation for the great exodus.

Like Noah, we emerge from our arks after our four or five months of partial confinement and look about us to examine the ravages wrought by winter's storms. Here we notice a broken shutter, there a step that needs mending or perhaps a touch of paint where frequent use of the snow shovel has scraped the surface bare. On the other side, a cellar window with a missing pane or a cornice soiled by water dripping from the roof, meet our gaze and demand attention.

And then come the happiest days of all. With hammer or paint brush in hand we patter about, breathing deeply the balmy air of spring, and proudly watching the transformation taking place under our hands.

Bit by bit the soiled and weather-beaten surfaces disappear until at last in the place of the home we have known, scarred by its battles with the elements, there arises the home we have dreamed of all winter, brilliant in its new dress of paint and varnish, every surface radiating the freshness and brightness of spring.

What an effect the annual rejuvenation has on every member of the family! Heads erect and spirits high, each feels new pride in the improved appearance of the place. For once it becomes the sole center of family interest, and all look forward to the hours to be spent in and about it during the magic summer days ahead.

And now the neighbors, who have looked on with envious eyes, are not to be outdone, and up and down the street in good-natured rivalry paint brushes and hammers fly. Soon the whole neighborhood takes on a brighter hue and all is spic and span to welcome the first days of summer.

Such is the effect of spring!

If ever the annual spring renovation could be done without, it is most certainly not in the spring of 1918. Not only for the psychological effect of new surroundings and bright colors upon us at a time when it is more necessary than ever before that we be of good cheer, but also in the interests of conservation. Spring painting must this year, of all years, be classed as an "essential industry." Not in years have labor and building materials of all kinds been so high in price and so hard to obtain Undoubtedly, for a longer time than any of us now appreciate, new construction and repairs of every kind will be exceedingly costly. Therefore, careful attention to existing property, and this must include frequent painting, is more necessary than ever if we are to protect our present highly valuable property investment and put off for the greatest possible time the necessity of expensive replacements.

Many people do not now realize that frequent painting is not an expense but the best kind of property insurance, but as prices mount it will be more and more obvious that it is more economical to maintain property in good condition than to replace it. While good paint, applied at frequent intervals, will

Painting is Necessary in Maintaining the Dignity of the Home

© Underwood & Underwood

Color is All Important in Maintaining the Appearances of Town Houses

preserve lumber almost indefinitely, wooden buildings poorly painted decay at an almost unbelievable rate. Painting is practically the only protection the property owner has against this untimely depreciation.

Nor can painting that is needed now be well postponed to a later time. To do that means that in the meantime the surface will be left without adequate protection, and that moisture and the attending decay will gain a foothold. Decay, once started, is almost impossible to stop. And later when the painting is done the surface will be in such poor condition to receive it, that more paint will be required and it will be much more difficult to obtain good results. The inadvisability of postponing painting beyond the time when it should be done to give protection can hardly be exaggerated.

Moreover, anyone who is deferring painting with the idea of waiting for lower prices is making a big mistake. Never has paint been so cheap, comparatively, as it is at the present time. While the retail price has increased from $2.75 a gallon a year ago to $3.50 at the present time, compared with lumber and all other staple commodities it is still relatively cheap. Actually, paint, far from being high, is a real bargain at the present time. How long its present low price will continue no one knows, but there is every reason to believe it is at the lowest level it will be for many years.

The part of wisdom, far from deferring paint purchases, is therefore to anticipate one's needs, and this is exactly what the wise property owner is doing at the present time.

Spring is the logical time for the hundred and one odd outside painting jobs that are necessary to keep a home attractive and in good condition.

Save the Garbage

An increditable amount of grease, fertilizer and glycerin is wasted annually in the United States through failure to properly utilize garbage waste.

Of cities with a population of over a hundred thousand, twenty-five throw away $2,400,000 worth of grease, $1,000,000 worth of tankage, 8,000,000 pounds of glycerin and 200,000,000 pounds of soap-making material. Twenty-nine, with a total population of 17,000,000, discard annually 1,200,000 tons of garbage, which would produce 70,000,000 pounds of grease, valued at $8,500,000 and 150,000 tons of fertilizer, valued at $2,250,000. Excluding cities of 100,000 population and over, the garbage wasted would produce annually 120,000,000 pounds of pork, worth $20,000,000 at prevailing prices. The output of glycerin in garbage now wasted would supply 8,000,000 pounds of nitroglycerin annually and would yield soap stock for the manufacture of 200,000,000 commercial cakes of soap weighing 12 ounces each.

Every city should have its own reduction plant and save this enormous waste.

Auto Used as a Shifter

Recently during a period of unusal congestion in a large eastern freight yard, it was impossible for a large shipper to get shifting engines to place freight cars at his platforms. The difficulty was solved by pressing a light pleasure car into service. Despite the fact that the loaded cars weighed more than twenty-five times as much as the auto, the experiment proved a success, and the trouble was overcome Other new uses for the auto are reported frequently.

Mountain Road Building

H. E. Breed, First Deputy Commissioner, New York Commission of Highways

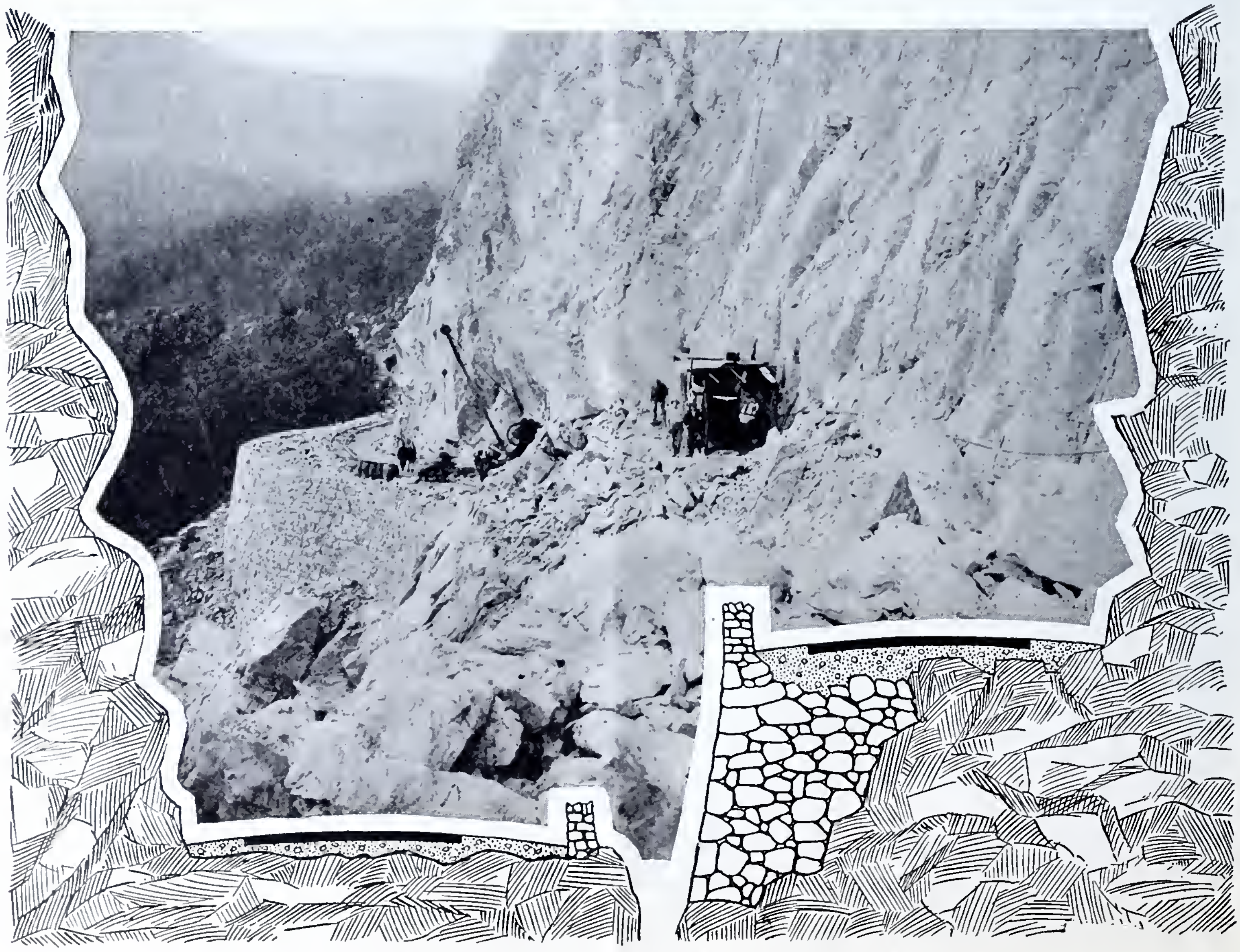
THE mountain roads being built each year in the United States, many of them opening up hitherto inaccessible regions of our country, are constructed in the face of difficulties which are seldom appreciated. In countless instances man's ingenuity and perseverance, aided by modern engineering methods, have triumphed over natural obstacles which until now have been insurmountable.

Such an undertaking is the building of the Storm King Road, the biggest and hardest piece of work ever attempted by the Highway Department of New York State. It illustrates in a graphic manner the unusual difficulties that are encountered in the construction of mountain roads and the methods which have been adopted in order to surmount them.

The Storm King Road is part of the state road that parallels the west bank of the Hudson River between New York and Albany. This route is now broken at West Point, and the only connection further north is over a rough and dangerous mountain path. The Storm King Road when completed will be of great commercial importance, as it will bridge the gap and greatly shorten the highway distance between two important cities, and thereby facilitate commercial travel in a densely populated region. It will also open up a region of great scenic beauty and afford the tourist rare possibilities in the way of vacation travel.

The southern face of Storm King rises practically sheer from the Hudson River to a height of 360 feet, and the cliff at certain points is very irregular and virtually inaccessible. The cliff was so rugged and precipitous that the equipment used had to be unloaded from the freight trains, repacked piece by piece, and drawn up by mules to the site of the work. The rock itself is of such unstable nature, due to erosion, that much of it had to be removed lest it fall from time to time and injure the workers. To complicate the situation even more, the tracks of the West Shore Railroad run at the foot of the mountain, almost directly under the road, so that anything dislodged above would fall upon the roadbed, block traffic, and imperil life.

Due to the inaccessibility of the mountainside, the work of surveying was most dangerous and difficult. The surveying was done in February and March, when the mountain was covered so deeply with snow that it was necessary for the men to work with life belts and ropes. On account of the irregularity of the



A Bit of the Construction Work—The Borders Indicate How the Rock Was Cut Away ace of the cliff, the survey could not be made in the usual way, by points taken at the top and bottom of the slope, and it was necessary to mark these places with rockets fired at points on the mountain. In other places a target was dragged over the face of the cliff and raised or lowered to the desired point.

The method of construction was also most interesting. It was begun by cutting into the earth or rock to form the inner half of the roadway, at the same time making a fill for the outer half. In places it was necessary to suspend ropes from above, sometimes to a length of from 200 to 300 feet, to support the scaffolds on which the drillers worked.

About 300 pounds of dynamite was the usual blast in breaking down the rock, but an occasional condition required as much as 600 pounds.

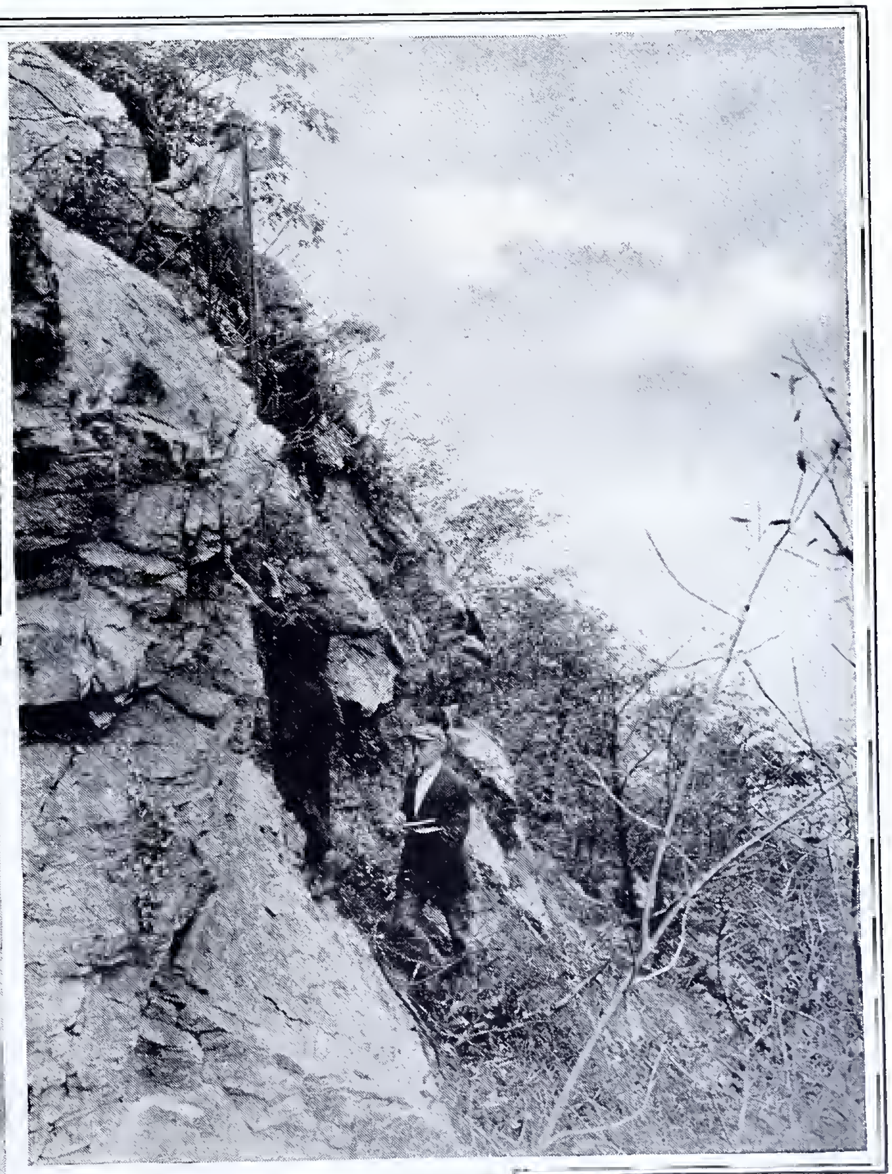
After the blasting had progressed considerably, the wall gang followed, building the supporting wall in sections. The wall footings were blasted out first, and a thorough examination made to see if dangerous cracks had been developed. Often it was necessary to go down a second or third time in order to secure a solid rock foundation. A strong masonry wall four feet high was built as a foundation to carry the dry masonry wall, which was brought to within a foot of the road and was topped with a masonry parapet wall built four feet above the road level.

The roadway when completed will be twenty-four feet wide with a sixteen-foot bituminous macadam pavement. The greatest depth of rock cutting is 130 feet, measured from the inside ditch to the top of the cut. The retaining wall at its highest point measures 50 feet. The deepest fill, which contains about 90,000 yards of material, is about 75 feet. There are 119,000 cubic yards of excavation; 50,000 cubic yards of ledge rock; and 25,000 cubic yards of stone masonry.

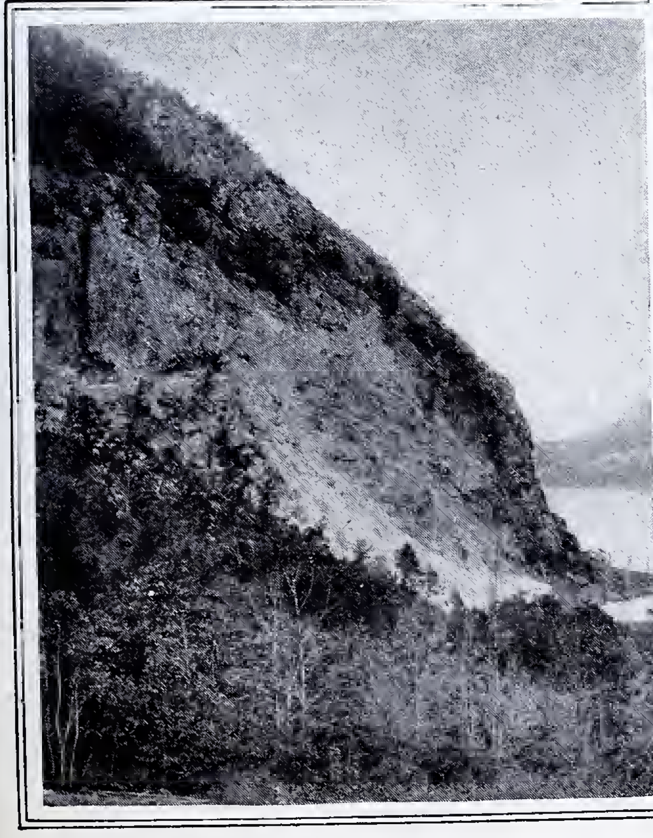
Most of the difficult work has already been done—enough to assure that no insurmountable problems will be confronted. Work on the road has been so encouraging that it is hoped to complete it before the end of 1918.

The building of the Storm King Road is but one instance of the successful application of modern methods of construction to the difficult engineering problems presented in road building.

The Storm King Road will be of considerable military importance. It is situated in a region now badly congested with military traffic—a condition which is likely to become worse as the war progresses and the strain upon our railroads increases. Its completion will provide a much-needed through highway between Albany and New York.



The Surveying Party at Work



Where the Road Led Along This Cliff

Iron the Civilizer

IT was in one of Dr. Steele's text-books, "Fourteen Weeks in Chemistry," I think, that he called attention to the fact that iron is the most valuable metal known. Gold has only a fictitious value as a medium of exchange, and its rarity precludes its use for other purposes, although if it were sufficiently common it would doubtless make good frying pans, forks and spoons, and wires for conducting electricity. The same is true of silver, and it is said that some multi-millionaires use this metal to make the pots and pans in their kitchens. Dr. Steele called attention to the fact that no metal is so enhanced by working as iron; that a pound of it worked up into hair springs for American watches is worth several thousand dollars, while a pound of gold is worth only about $300.

On one of the old Indian trails in northern Canada, there is a canoe portage which exposed native silver, several inches wide, polished bright by the dragging of canoes out of one lake to be carried over to another. The Indians no doubt noticed this metal, but, finding that it would not take an edge and required a very high heat for melting, lost interest in it and left it there. On the other hand, a mass of meteoric iron which fell somewhere near the Arctic Circle and which Admiral Peary brought back to the American Museum of Natural History, had been visited for years by the Eskimos, who laboriously sawed and chiseled off pieces of this precious metal to make into knives, spears, and possibly fish hooks.

It is probable that iron is the earliest useful metal known to man, pieces of it in the form of knives having been found in the Pyramids of Egypt, and although bronze implements antedating this have been found, there is little doubt but that the propensity of iron for rusting, disintegrating and being lost is responsible for its not being found among the implements of prehistoric man.

Certain African tribes in the interior of the continent who have never seen a white man, who never come in contact with other tribes, and who are at present almost in the Stone Age, have been found by explorers working a crude furnace by which iron ore and charcoal were smelted down by the aid of a crude bellows.

The knives and spears made by these savages and used for hunting, and possibly for war, bring out quite forcibly the part that iron has played in the history of nations, especially with regard to its use in warfare and the necessity of its possession by any nation aspiring to lead the world either in peaceful arts or in war. In historical times, the superiority of the steel swords made in Spain and used by Hannibal at the battle of Cannae was probably responsible for his victory over the Romans, who did not make as

The Entrance to a Rather Unusual Iron Mine

A Cuban Iron Mine Where the Ore is Removed in Terraces

good a grade of steel. The fame of the old Toledo blade and the Damascus blade is familiar to every schoolboy, and the possession of one of these blades was the ambition of every swordsman in the Dark Ages, when the art of making them had become lost.

Until the year 1890 the British Empire produced more steel than any other nation, and her leadership in commerce and manufactures during that period was unquestioned. Since then the United States has manufactured more steel than any other nation, and at the present time bids fair to eclipse Great Britain as a commercial nation, as she has already eclipsed her in manufacturing.

It may have been the desire on the part of Germany to obtain possession of the iron mines in Lorraine, at that time the only known deposits of iron ore in France, which prompted her to make war upon France and seize this territory in 1871, and it may have been the desire to possess the iron mines, with the equally essential coal deposits of Belgium and northern France, which prompted Germany to strike at that point instead of through Switzerland at the beginning of the present war. At any rate, the prime necessity for the successful prosecution of a modern war is steel, and more steel, and still more steel. It is the steel shell, the steel shrapnel balls, the steel cannon, the steel rifle, the steel ships, and the steel rails, and their possession in superabundance which seems to be the deciding factor in modern warfare.

Now, where does all this steel come from? Germany with her conquered provinces produces about 30,000,000 tons of ore per year; Great Britain not quite this much; France very much less; and the United States nearly 100,000,000 tons.

The greatest single producer of iron ore in the United States is the wonderful Mahoning-Hill-Rusk pit near Hibbing, Michigan. In this deposit, the rich ore is so soft and so penetrable that after it is broken loose by blasting it can be dug almost like so much earth by means of gigantic steel shovels, loaded directly on to cars, and brought by the Great Lakes almost to the doors of the blast furnaces.

Blasting powder is used to loosen these ores so that they can be handled by the steam shovel. For economy in mining—that is, for low cost of producing the ore—no deposit in the world compares with those of the Mesaba Range in Minnesota, in which this wonderful pit is located.

Besides the open pit mining operations of Mesaba Range, there are a great number of deep iron mines in which the ore is mined economically by the aid of vast quantities of dynamite. Ores containing a higher percentage of iron are contained in other parts of the United States, notably the Gogebic Range in Wisconsin and Michigan, the Champlain district of New

Mahoning-Hill-Rusk, the Largest Iron Mine in America. The Opening Shown is Almost a Mile Wide

York, and some of the iron mines in New Jersey and Pennsylvania. All of these are hard haematite or magnatite and require the use of explosives to mine them.

One of the most remarkable deposits of iron ore in the world occurs in the Birmingham district in Alabama, where two ridges or small mountain ranges run parallel; one containing rich iron ore; the other, only a few miles distant, containing vast deposits of coal; while in the middle of the valley are great quantities of limestone; so that the three essentials for the blast furnaces—the iron ore, the fuel, and the flux—are found side by side. In this district, the cost of producing steel is so low as to make an European statesman weep. But it must be remembered that this low cost of production, even in this most favored region, could not be realized if there were no explosives on hand to enable the miner to win the ore, the coal and the limestone. In the rich ore deposits of magnatite and the so-called "steel" ore of northern Michigan, the ore is so hard that without the use of modern explosives the miner would be utterly unable to produce any ore whatever.

Given the essential raw materials—ore, coal, and limestone—conveniently located, there is still required labor, capital, and brains to produce the finished product, steel. But in this catalogue of the essentials, it is not often realized that there is another essential without which labor, capital, and brains could not evolve steel from ore, fuel, and limestone; this essential is explosives.

Keep Up the Highways

This is no time for a letting up of highway construction and maintenance. The nation has never been in such need of good highways and connecting roads as now. As the war goes on, more and more of our transportation will have to be done by motor truck. The army supply and transport service and postal service both require, to a constantly increasing degree, an unbroken chain of interurban communications.

Poor highway surfacing and grading mean increased cost of motive power, costly wear and tear on valuable equipment and expensive delays.

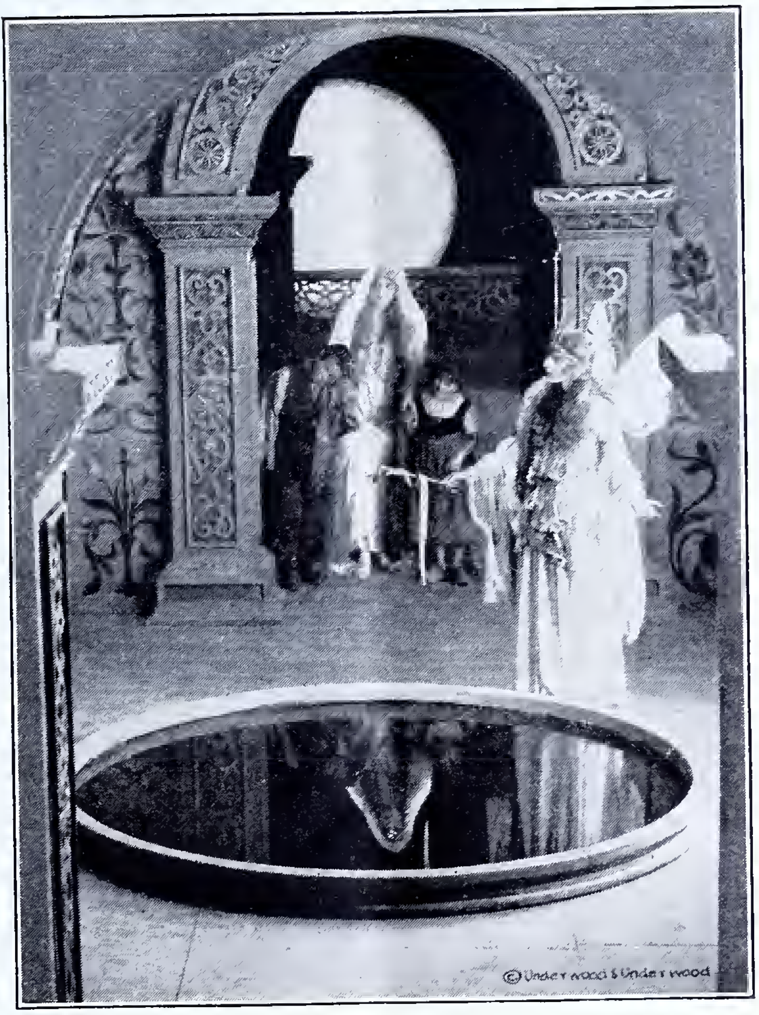
A Well-Graded Highway

Evolution of the Mirror

IN legend and history it is told that the first mirror was contemporary with the first woman. Whether or not this was a coincidence or a special dispensation of Providence will never be known. At any rate, from that time forward, in every age, the lady and her mirror have been one and inseparable.

Some men have also been accused of succumbing to the charms of their reflected glories.

When Mrs. Eve wished to note the effect of her latest leafy creation, it was comparatively an easy matter. She repaired to the nearest pool, there to behold all her beauty in its crystal surface. This was a simple arrangement, and one that would, undoubtedly, find supporters at the present day. Unfortunately, or perhaps fortunately, ideas change, and with increasing traffic about the community pool complications arose that made necessary an arrangement somewhat less romantic, but more in keeping with the social precepts of today.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A Fountain Used as a Mirror

The first mirrors for individual use, shown in the leading department stores about 700 B. C., were metallic—usually of tin or bronze. A thin and slightly convex disc of metal was polished on one side and on the other left plain. It was strictly a utility and laid no claim to beauty. Silver mirrors have also been found, which it is thought were in use at the time of Pompeii. This type of mirror is still in existence as a part of the field equipment of the boys at the Front.

In size the metallic mirrors of the ancients were not unlike the hand mirrors of today, though the early examples have no handles. These sufficed until the time of the Roman Empire, when one fine day the first lady of the land was seized with the notion that she should be able to view her figure "from head to toes" instead of only a part of it. So a craftsman of the court, his wits made nimbler by the "strafing" to be administered if he did not produce, evolved an ingenious arrangement whereby a piece of metal could be lowered or raised like a window sash so as to take in the whole figure.

The first mirrors to have handles like those of today were used in Greece. Usually the handle was carved, often in the form of a miniature statuette of Aphrodite. Others were even more elaborate. A little trinket gotten out for the holiday trade in 400 B. C. was a "vanity mirror" of metal, consisting of two circular discs, fastened together with a hinge, the upper one ornamented on the outside, the lower one polished to reflect the face.

In ancient Greece mirrors were used for divination as well as for their powers of reflection. The custom was to lower the mirror into a well until it grazed the surface of the water with the rim, when it was pulled up and, when looked into next, showed the face of the person who would benefit by this ceremony.

During the Middle Ages, the society lady carried her little metal mirror at her girdle or in an embroidered pocket. The pocket mirrors were small plaques of a brightly polished metal—usually steel or silver—fitted in a small, circular box and covered with a lid. The mirrors worn at the girdle had no cover, but were furnished with a short, ornamental handle.

It was not until 1250 that the practice of using glass backed by thin sheets of metal for mirrors was inaugurated, but it developed rapidly. In 1373 a guild of glass mirror makers was formed and small globular mirrors, called "Bull's-Eyes," were turned out in great quantities by the use of blow pipes.

The credit of being the first to develop the making of fine mirrors on a commercial scale is given to Venice. For a century and a half that republic enjoyed practically a monopoly of the art, and Venetian glass mirrors were without an equal. The Venetians were jealous of their trade and had a little way of protecting the home industry that was novel, but effective. It was the law that if any glass maker carried his art to a foreign state, emissaries were delegated to pursue and slay him. That these minions of the law usually got their man is very apparent, for it was not until 1664 that any other country succeeded in spiriting away any of the Venetian workmen. At that time, Colbert, the French Minister, induced twenty Venetian glass makers to take up their residence in France. As a result of this and of the development of plate glass in 1691, the mirror industry in France grew rapidly, and French mirrors soon excelled those of Venice in quality.

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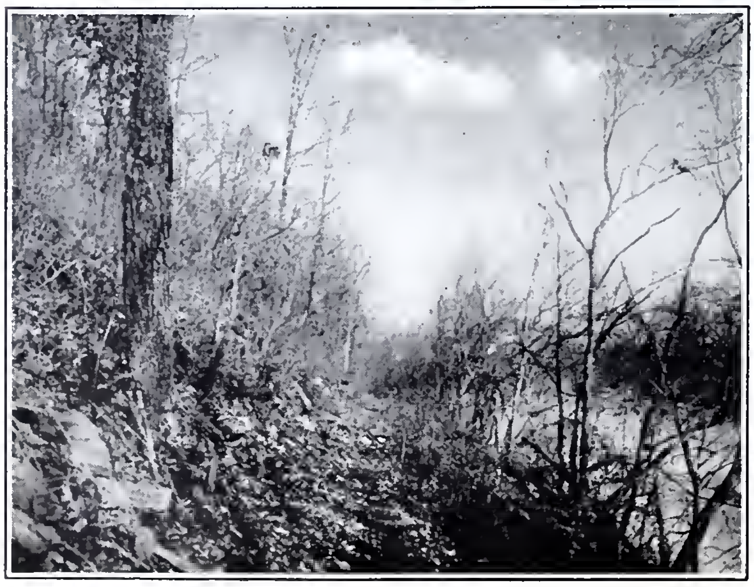
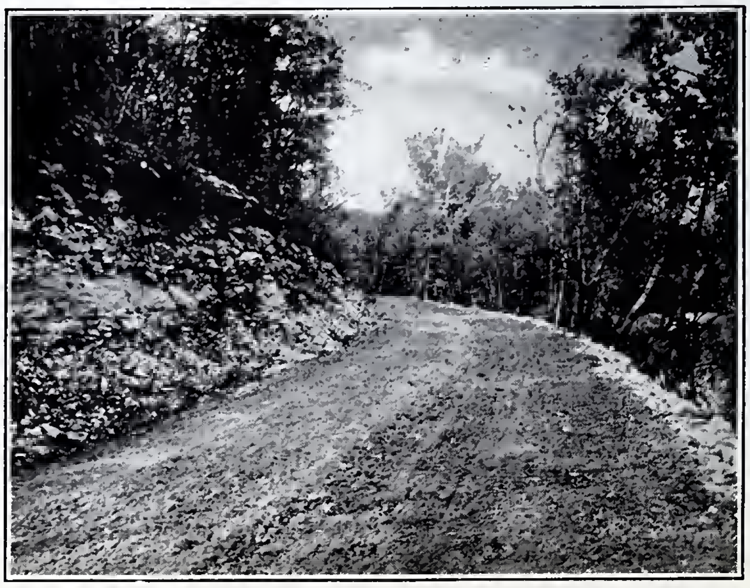
Since the adoption of glass mirrors, many rare and beautiful metals and materials have been used for cases. Gold, silver, enamels, ebony, and other costly materials, often set with precious and semi-precious stones, were used.

From time immemorial ivory has been the most prized of all materials for mirror backs and many other dainty and exquisite articles of the toilet. Today, in ivory py-ra-lin, the modern substitute for ivory, there is the counterpart of the ivory of old. Its chaste coloring and delicate graining place it beyond comparison with any metal in grace or charm. Its soft, creamy, untarnishing surface lends itself completely to the engraver's art, and its loveliness has given it a perpetual place of honor in the boudoir. It lends itself to exquisite monograms of any design or color. The background may be etched to bring the desired pattern out in beautiful bas-relief. Hand carving may be added to produce effects unique and charming.

A Road Transformation





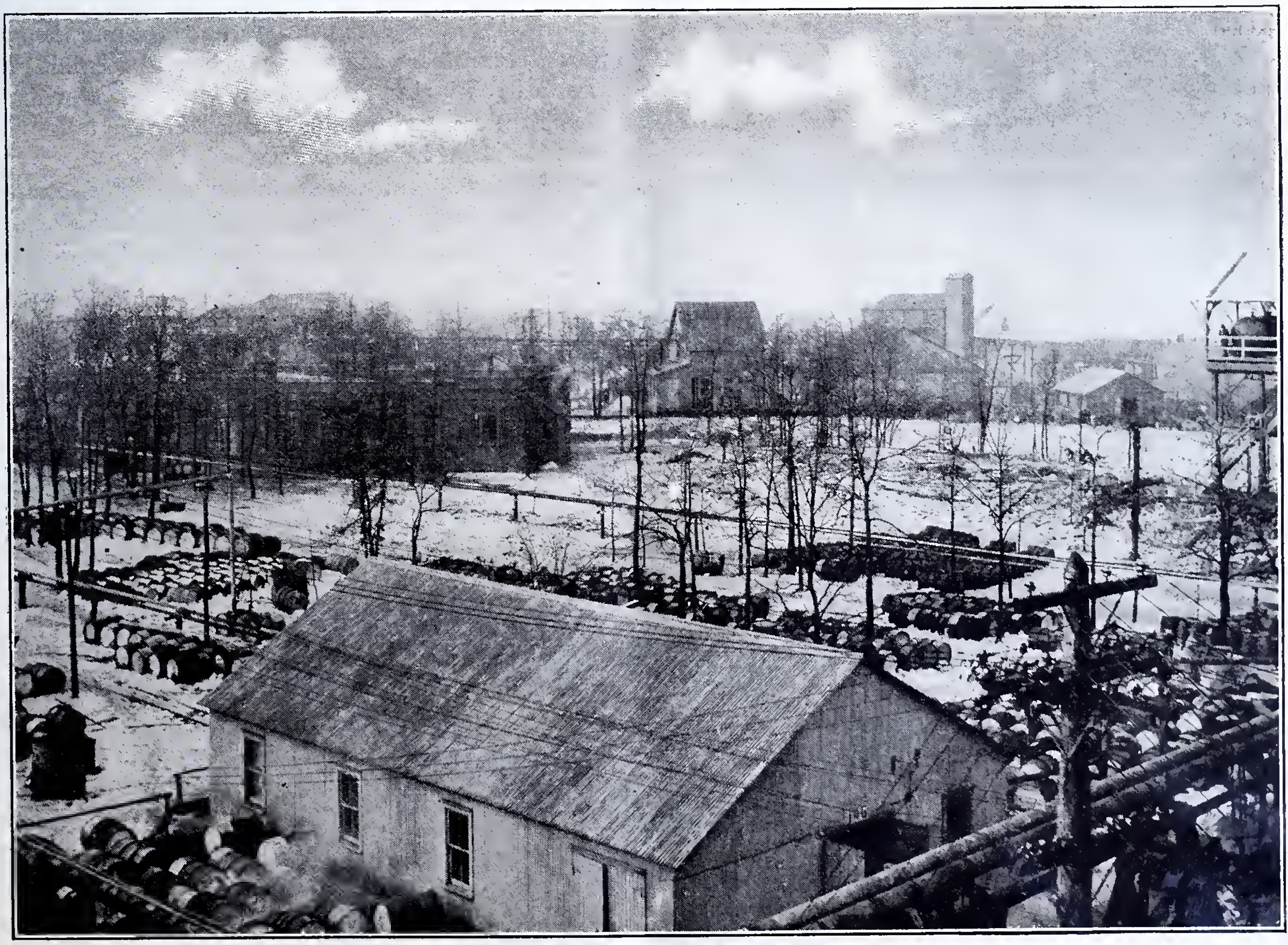
Solvents for Nitrocellulose

John N. Hans

No doubt the word "Solvent" is one which, to many of us, is confined largely to use in laboratories and dry scientific books. Colloquially the word is seldom used, and but little do we realize the frequency with which we come in contact with the work of solvents in the course of our daily routine. For example, to our morning cup of coffee we add some sugar, and in a moment the sugar seems to have disappeared—we say it has dissolved—and our coffee is the more palatable. Or to a glass of water is added a little of salt, and in a few moments the salt is no longer seen, although our taste will tell us it is there. We say we have a solution of salt. In other words, the water has exerted its solvent action and the sugar and the salt are no longer solids, but act like a liquid itself. Water is then a solvent, and indeed it is the most common of solvents.

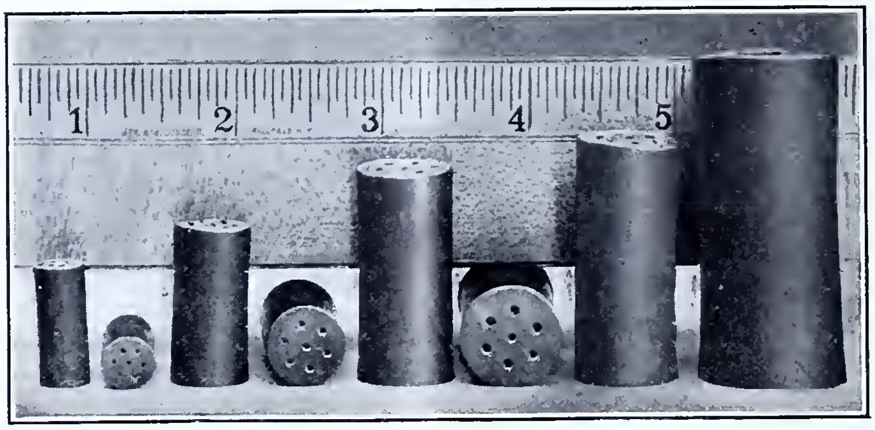
In the nitrocellulose industry there are many solvents used for dissolving the cotton, just as the water dissolved the sugar, and converting it into other useful compounds. Nitrocellulose is, as has been seen in a former issue, similar to ordinary cotton in appearance and is a chemical compound obtained by treating cotton with a mixture of nitric acid and sulphuric acid, sometimes called "oil of vitriol." And were it not for solvents, the nitrocellulose industry would never have reached the plane which it occupies today. They are used in the manufacture of py-ra-lin; such leather substitutes as fabrikoid, collodion, lacquers and smokeless powder. The more important are amyl acetate, ethyl acetate, acetone oil, commercial wood alcohol, methyl acetone, acetone and a mixture of ether and ethyl alcohol. These can be divided roughly into solvents for nitrocellulose to be used in the arts, and solvents to be used in the service of Mars. Prior to the present war, the American industries made use of the former class to a much greater extent than the latter. For it was the peaceful rather than the warlike side of these industries that received the greatest efforts; and while at the present time the manufacture of smokeless powder and the winning of the war is uppermost in the minds of all, when the Dove of Peace again makes her appearance among the haunts of men, it will be to the business of peace that all industries must look for stability and prosperity.

Most of the solvents mentioned have lowly origin and come from the most commonplace materials. Several are obtained from wood by a process known



A Plant Unit for the Preparation of Solvents and Cotton Solutions

as "destructive distillation." The wood, which is the hardwood waste of saw mills and lumber camps, is placed in iron vessels or retorts and heated gradually to a temperature of 800° Fahrenheit or more. A pipe connected to the retort and running through a tank of cold water serves to remove all the vapors which are given off by the wood. As these vapors are driven through the cold portion of the pipe, some are condensed to form a liquid to which has been given the name of "pyroligneous acid"; others, when further cooled, form a tarry substance and are called "wood tar." Still others remain as vapors or gases and are burned under the retort. When the temperature of the retort has reached a sufficiently high degree, it is allowed to cool, and the residue—charcoal—is removed. The liquid pyroligneous acid is met with unslaked lime, forming acetate of lime, from which acetone and acetone oil are obtained. Further rather intricate treatments yield commercial wood alcohol and methyl acetate.



Grains of Cannon Powder

Ethyl alcohol, commonly called "grain alcohol," is derived mainly from starchy materials, such as cereals and potatoes. Other sources are molasses and sawdust. The starchy materials are washed and steeped in hot water, which causes the granules of starch to swell and burst. Malt, which is simply grain which has been allowed to sprout and then dry, is added. This contains a body called "diastase," which changes the starch to sugar. The addition of yeast to the sugar forms alcohol, which is purified by distilling.

A large plant, devoted exclusively to the manufacture of grain alcohol from green pine sawdust, is located at Georgetown, South Carolina, and its success is a monument to the perseverance of the industrial chemist in his search for sources of materials other than from food products.

The liquid residue left after the alcohol has been removed by the ordinary methods of distillation contains a small percentage of amyl alcohol, which is removed and treated with chemicals, derived from the distillation of wood, to change it into amyl acetate. It has a very pleasant pear-like odor, and before the passage of the Pure Food and Drug Act was used to some extent as a fruit essence. The same chemicals used in changing amyl alcohol into amyl acetate are used to convert ethyl alcohol into ethyl acetate. This latter also has a pleasant fruity odor, and was formerly used to some extent as Essence of Apple. These are both important solvents in the industry.

Ether occupies the peculiar position of being used in the manufacture of smokeless powder for the Allied armies, and being also used by the surgeon in the operating room in his efforts to restore and rebuild. It is made by bringing grain alcohol in contact with hot sulphuric acid, whereby a chemical change takes place and the alcohol becomes ether.

All these and many other equally interesting chemicals, and the most painstaking methods of combining them, are necessary in developing the dissolved cotton industry.

The Day of the Leather Substitute

THE war has brought about many changes in our industrial life. Many of them are makeshifts which are undoubtedly with us only for the duration of the war. But by far the greater number are improvements over previous methods, the benefits of which we will continue to reap long after the war is over. That necessity is the mother of invention has never been more clearly demonstrated than in this present emergency, which for a time threatened to suspend our most vital and fundamental national activities, but which has instead developed, as nothing else could ever do, the full power of the nation's resourcefulness. Under the spur of necessity we have in the last three years overcome time and again seemingly insuperable obstacles, we have accomplished in countless instances things that we have until this crisis considered impossibilities; we have learned to do nearly everything more efficiently and more economically.

Foremost among those changes which will result in establishing American industries on a more secure and more permanent basis following the war than they have ever been before is the substitution of materials the value of which has been previously little known or appreciated for other materials, the supply of which has been cut off or greatly diminished by the abnormal conditions which have developed and are likely to continue as a result of the war.

The growing realization that in many instances there is not enough of food or materials to go around, the diversion of materials from their ordinary purposes to the new uses of war, the resulting shortages that have developed in materials and supplies, hitherto used with a lavish hand, has resulted in a conscientious searching for materials having the same virtues and qualities which, by their general adoption, might increase the available supply of like materials to a point sufficient for our needs. In a majority of instances such materials have been found and the fact that many of them have hitherto been unused or used to little advantage, and that a great many others have been found more suitable for the purpose, price and availability considered, than the material which they have replaced, is evidence that this general tendency toward substitution of one class of materials for another with the same general characteristics has resulted in a real economic gain.

In view of the foregoing it should not be assumed that the leather substitute—by which is generally meant a cotton base fabric, coated with a pyroxylin solution, colored and embossed with the natural grain—has come into use because of conditions created by the war. It has not. Artificial leather has for many years had an increasing use in many and various industries. It does, however, owe, in large measure, to the war its almost universal adoption as a substitute for leather in the home and in nearly every manufacturing industry of size, and the growing realization that for most every purpose it is the equal and in many cases superior to any but the very highest quality of natural grain leather. It is in every way a superior product for upholstering and miscellaneous purposes, and it is in these industries that its use has met with the greatest favor.

The diversity of the uses to which artificial leather is being put at the present time is little short of astonishing. Practically everywhere that leather can be used its counterpart, the leather substitute, finds employment. In furniture and automobile upholstery, automobile and carriage tops, bags and suitcases, book binding, trunks, camera cases, manicure, jewelry and instrument cases, hand bags, harness, clothing, gloves, puttees, counter mats, gun cases, pillows, hats, toys, belts, storm aprons, base-balls, leggings, shoes, military vests, car curtains, vestibule curtains and novelties of every description, it has largely replaced leather with the most satisfactory and economical results.

By far the greatest use of leather substitutes is in the manufacture of automobile and carriage tops. It is estimated that in this industry alone 25,000,000 yards of leather substitutes are used annually. This includes not only imitation leather of the pyroxylin type, but also the various rubber-coated materials used chiefly in carriages and low-priced automobiles. Leather, which at one time was the sole material used for high-grade vehicles, has now been replaced in this industry almost entirely by leather substitutes, which have been found more satisfactory because of their lighter weight. The adoption of leather substitutes in this industry has resulted in great economies, and has released enormous supplies of leather for other industries where its use is indispensable.

In the upholstering of automobiles another 10,000,000 yards of leather substitutes are used annually. Over 75% of the popular-priced automobiles manufactured in America in 1917 were upholstered in leather substitutes of one kind or another. Because of its greater tensile strength and wearing qualities artificial leather is fast displacing leather splits in this class of trade.

In furniture upholstering leather substitutes are now the choice of the most discriminating manufacturers, furniture dealers and purchasers of high-

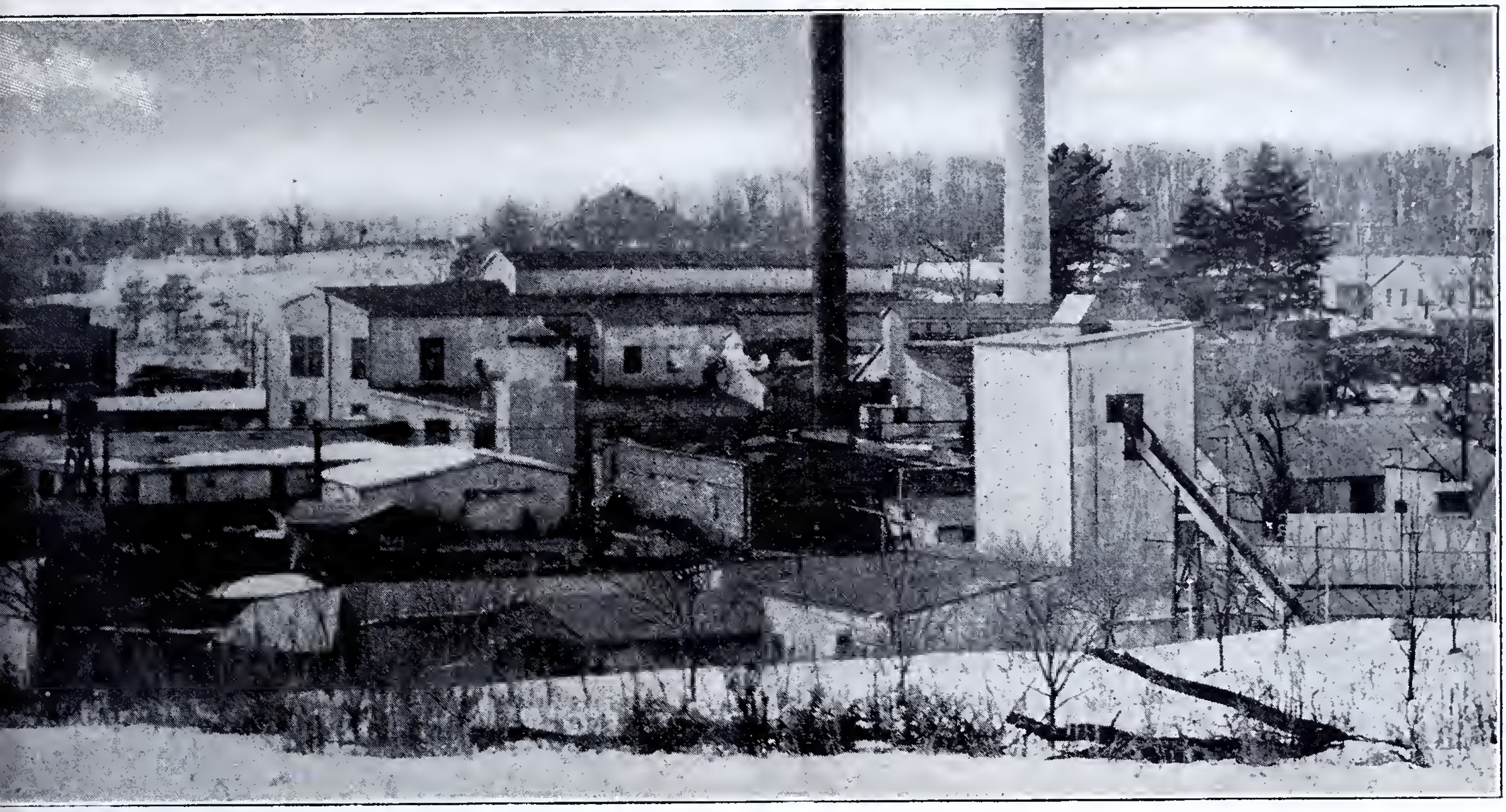
A Sumptuous Interior Finished in a Leather Substitute

grade furniture. Their great economy over natural grain leather and superior wearing qualities over split leather has made it the logical material for furniture upholstering.

In bookbinding, literally millions of yards of artificial leather are used annually. Exact figures cannot be obtained, but it is known that the use of artificial leather for bookbinding is increasing annually with leaps and bounds. Whereas even genuine natural leather will decompose in time, even if untouched, artificial leather is practically unaffected by moisture or decay. It also has the quality of being insect and rat-proof, which makes it valuable as a protective covering for rare volumes.

Another use of artificial leather, important as it is unexpected, is in the manufacture of hat sweats. In 1916, 127,000,000 hat sweats were made in the United States alone, and it is estimated that half of them were made of artificial leather. The tremendous saving in leather for other industries can be imagined.

This Enormous and Ever Growing Plant is Devoted Exclusively



But a few of the many uses of leather substitutes have been mentioned—enough, however, to give some idea of the vast quantities of leather that are released for indispensable industries by their use. The present emergency requires the utmost conservation of leather if our armies are to be properly equipped. Our government, following tests which fully demonstrated the economy and superior service qualities of leather substitutes over leather for many uses, has taken the lead in the conservation of leather by specifying artificial leather for the upholstering of our fighting craft and the ships of the new merchant marine. It is not only to the advantage of the manufacturing and consuming industries to follow suit. It is their patriotic duty.

The use of leather substitutes for upholstery, tops, bookbinding and the thousand and one miscellaneous uses for which it is so well adapted means that leather will be available in sufficient quantities where it is necessary and indispensable—in the shoes and equipment of our armies.

of Leather Substitutes that are Relieving the Shortage of Leather

The War to Win the War

"SEND us food and then more food," is the cry of war-torn Europe. All authorities who have studied the war conditions say that food will win the war; that the side which can the longest continue to feed its fighting forces and its civilian population will be the ultimate victor.

The war in Europe is playing havoc with farming over there. Millions of acres of Europe's farm lands are idle and probably will remain idle for years after the conclusion of the conflict. This condition puts it up to America to produce food enough for all and she can do it because she has the land, provided every acre of it is cultivated and forced to maximum production. The millions of acres of cut-over land and swamp land that now occupy parts of our country should be included in the cultivated areas.

Think of what it would mean if the 400,346,575 acres of unimproved land in this country were put to work producing crops. Beneath the stumps and rocks is concealed a gold mine, and there is more profit to be derived from the mining of farms than from the mining of mountains. The ground occupied by one average stump will produce from twenty-five to fifty cents' worth of food per year.

The cost of clearing land must be paid but once, whereas the profit derived from it will go steadily on through generations. Cleared land is virgin soil which for years after the clearing and "taming" will yield bumper crops, with minimum expense for fertilization. Expenditures for land clearing are permanent investments that will be returned many times over in profitable crops.

Recently President Wilson addressed several hundred representative business men attending the annual convention of the Chamber of Commerce of the United States. He said he wanted to convey to the farmers throughout the country the necessity of cultivating more land. He said:

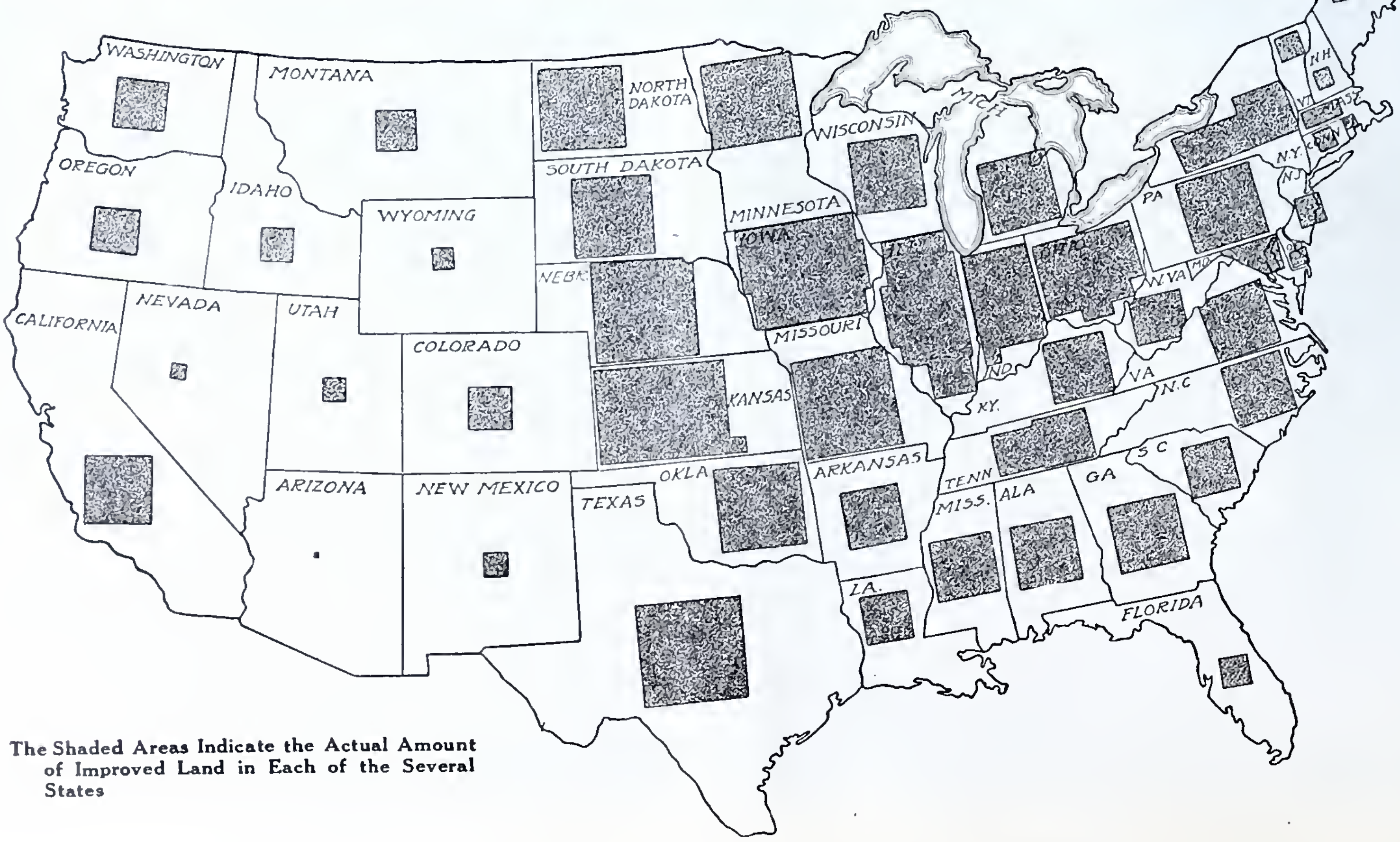
"There is a shortage of food in the world now. That shortage will grow constantly more serious. It is necessary that there should not be a plow or spade idle in this country if the world is to be fed."

Mr. Herbert C. Hoover, the National Food Administrator, feels that the Du Pont Company's advertising is a valuable aid to the Food Administration because it preaches the doctrine of more land clearing. In a letter written to our President recently, Mr. Hoover said:

"Mr. Maxwell, the head of our Outdoor Advertising Department, has shown me the rough proofs of two of your advertisements for farm papers, and it may be in order to express my appreciation of this indirect, but nevertheless substantial, support of our efforts tending to increase our production and conservation of our great grain harvest, looking toward the successful termination of this war."

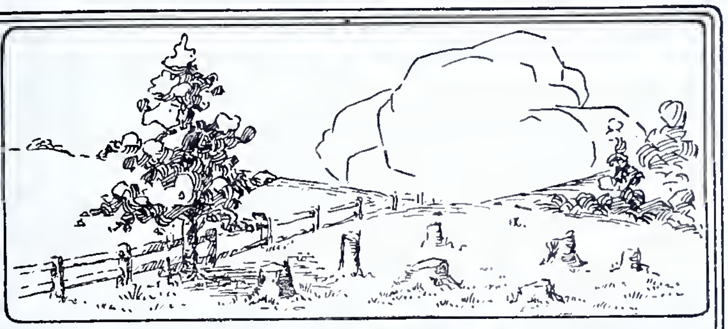
The University of Wisconsin is one of the country's greatest educational institutions. However, it is more than a mere school. With characteristic altruistic viewpoint, it is interested in the development of the State. Wisconsin is a region famous for its production of grain, potatoes and dairy products, everywhere recognized as among our most important food products.

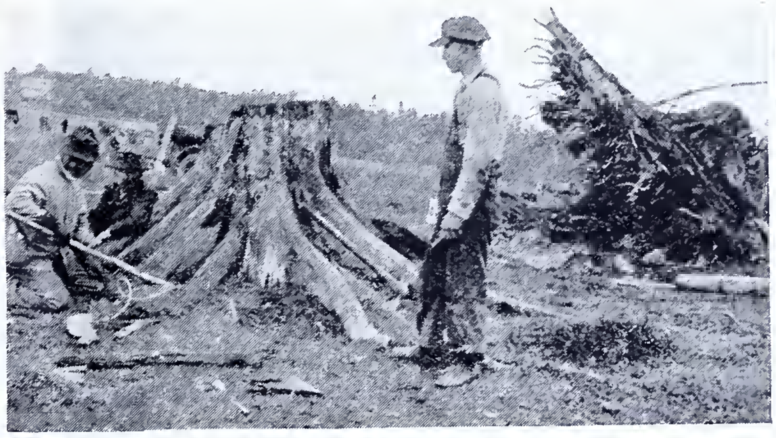
In Wisconsin there are still thousands of acres of very fertile cut-over land. With its usual commendable enterprise, the University set about to see what could be done to get more of this land cleared and under cultivation, and in the



The Shaded Areas Indicate the Actual Amount of Improved Land in Each of the Several States

LECTURING TO THE CROWD





LOADING THE STUMP

THE BLAST

FIELD OF STUMPS AFTER BLASTING

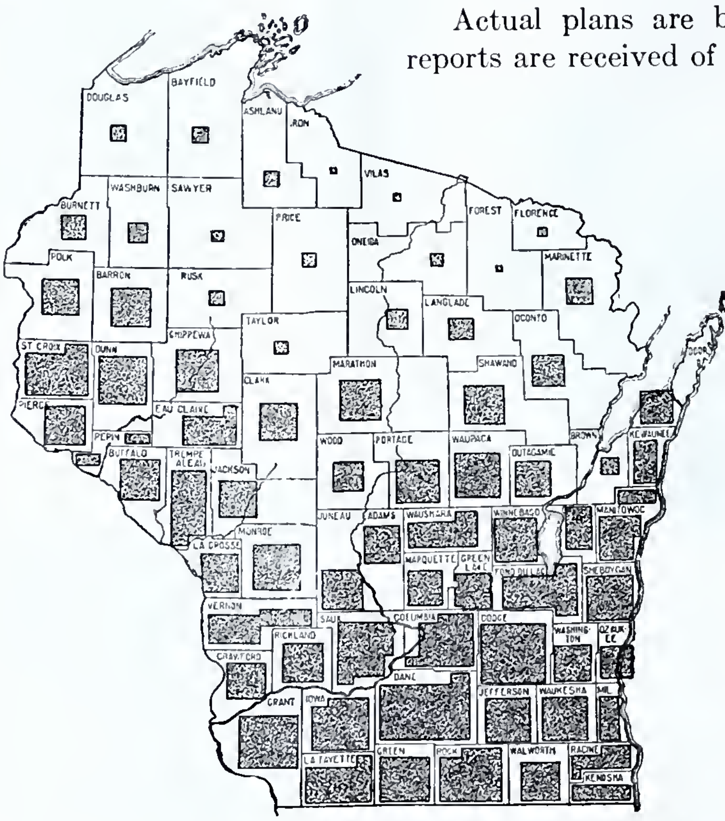
THE STUMP PILER

THE LAND CLEARING SPECIAL

spring of 1916 before the United States had entered the war, sent out an agricultural engineer to locate points for large public land clearing demonstrations. The University itself organized a demonstration crew and obtained the co-operation of three railroads operating in the State to run trains over their roads with a view of showing the settlers how to clear their land.

The Du Pont Company participated in the demonstration, showing how to clear land by blasting the stumps with dynamite. Several manufacturers of stump pullers had their demonstrators show their methods of clearing. Up to that time, the powder manufacturers and the stump puller men had regarded themselves as bitter competitors. The University's demonstrations, however, proved that they were really co-operators, for the fact was developed that the best method of land clearing was a combination method in which dynamite was used to loosen and break up stumps after or before the pullers pulled them.

The State Legislature of Wisconsin, its interest aroused by the University's demonstrations, recently passed a law making it easier for settlers and owners of stump land in Wisconsin to buy dynamite or stump pulling equipment with which to clear. Under certain conditions, the State will place orders for dynamite, usually purchased in carload lots in order to get the lowest price, and permit the settlers to pay the State Treasurer in easy installments and under conditions which they can easily meet for the dynamite they use.



The Shaded Areas Show the Amount of Developed Land in Each of the Counties of Wisconsin, a State Where Much Energy is Being Expended in Land Clearing

Actuated partially by the same motives, the Congress of the United States enacted laws under which the new Land Banks were organized in many localities, and these banks also make it easy for farmers to obtain funds with which to clear and otherwise improve their farms and operate them more extensively.

The farmer no less than the soldier is fighting the battle of freedom. Without farm products, the soldier would be as helpless as the engine without steam or fuel.

Probably no more favorable opportunity to clear stump land will ever present itself to the owner of such land. The unprecedented demand for abnormal quantities of food products at abnormally high and profitable prices offers the chance to get the money for land clearing that will probably never come again.

Even the fuel shortage helps land clearing, for in some cases it is now possible to sell stump wood for as much as the clearing costs.

The Gentleman Farmer and Food Production

PRACTICALLY every suburbanite and others who have small areas of but partially developed garden lands on their premises have long entertained dreams of seeing these lands developed into flourishing plats yielding necessary crops, but have lacked the incentive to make a start. At no time in the history of America has the demand for such gardens been greater, and, now that there is the element of patriotism added to the earlier dream, there is little doubt but that 1918 will mark a decided improvement over the good work of 1917 in home-grown foodstuffs by these men who have both the financial means and the idle land.

Actual plans are being formulated and frequent reports are received of work already undertaken.

In one case a man of comfortable means has already bought two milch cows, not because he feels that he can derive a profit from them, but because he realizes that the closing out of dairies in his vicinity will create a shortage in dairy products.

A wealthy business man owning an estate of but a few acres devoted all suitable land to growing potatoes last year, and allowed his men who maintained their own homes sufficient time to cultivate gardens that yielded well. He will continue this arrangement.

Even the flower beds and borders that have been so generously fertilized and watered for years are being devoted to the growing of light truck crops, especially those maturing early. Many of these vegetable beds, if properly cared for, will be almost as attractive as the flowering plants formerly grown, and will have far more personal interest.

There is now an excellent opportunity for those who can to assist materially in increasing food production.

Free Game Law Summary

There has been issued by the United States Department of Agriculture a summary of the provisions of the Federal, State and Provincial laws, as they apply to our game. This booklet is the most complete pamphlet of this character that has ever come to our attention. It is for free distribution, and may be obtained by application to the Division of Publications, United States Department of Agriculture.

Everyone interested in American game birds or animals should write for a copy of this booklet.

Federal Explosives Regulations

FOR the benefit of those purchasing or using explosives and explosive ingredients, the following letter has been sent out by the Du Pont Company.

DEAR SIR:—

For your information and guidance we beg to quote instructions issued by the Bureau of Mines, Washington, D. C., under Federal Explosives Act—Public No. 68—65th Congress—H. R. 3932, governing Explosives.

"*CERTIFIED COPY FILED WITH MANUFACTURER*

"*Every manufacturer, dealer or other person selling explosives shall, if the purchaser appear in person, require the presentation of the license under which the purchase is made; or, if the order is received by mail, telegraph, etc., he shall require A CERTIFIED COPY of the purchaser's license to be on file in his office. Provided, that if sales are made through traveling salesman, and the purchaser presents his license to such salesman at the time of the placing of the order, it will not then be necessary for him to have a CERTIFIED COPY on file with the vendor. Such salesman must, however, in forwarding the order to his employer, state that a proper license has been presented to him and give its class and number upon the order.*

"*NUMBER OF LICENSE SHOWN ON BILL OF LADING*

"*Before making delivery of any less than carload shipment of explosives and ingredients to a carrier, the vendor must plainly stamp or MARK THE NUMBER OF THE CONSIGNEE'S LICENSE on the bill of lading and shipping order, or on whatever other receipt may be given by the carrier as follows:*

"*UNITED STATES EXPLOSIVES LICENSE NO. ——*

CERTIFIED COPY FILED WITH RAILROAD AGENT

"*The agent of any carrier at the final destination of any such shipment, before making delivery to consignee, shall require the consignee to file with him a certified copy or to exhibit the original license or CERTIFIED COPY thereof, authorizing such consignee to purchase, accept or receive such explosives, and such license must correspond with the waybill as to name and number of license. When such shipments are made to non-agency points, delivery may be made to consignees, known to the train conductor upon presentation to him of the license or CERTIFIED COPY corresponding with the waybill as to name and number.*

"*Teamsters or other persons hauling explosives from delivery stations must be properly authorized by the licensee to accept and haul such material.*

"*MANUFACTURERS OF EXPLOSIVES*

"*Every branch office and shipping magazine should be furnished with a CERTIFIED COPY of such licenses as are necessary for the business therein transacted.*

"*No order shall be accepted unless the purchaser produces the license or has a CERTIFIED COPY on file with the vendor, excepting as provided for in rules covering shipment of explosives, etc.*

"*VENDOR OF EXPLOSIVES*

"*Vendors must require every customer making purchases of explosives in person to produce his license and must satisfy themselves as to such customer being the legal owner of the license presented, and must have on file CERTIFIED COPIES of the licenses of such customers as order by mail, telegraph, etc.*

"*In shipping explosives to their customers by common carriers, vendors must show the purchaser's license number on the bill of lading and other shipping papers.*"

From the foregoing Regulations it will be observed:

1. Persons purchasing explosives in person are required to present their license to the manufacturer or vendor with every purchase, and to present such license or file certified copy with the Railroad Agent at destination before they can receive explosives.
2. Persons ordering explosives by mail, telegraph or telephone, must file a certified copy of their license with the manufacturer or vendor from whom purchase is to be made and present the original license or file a certified copy with the Railroad Agent at destination to receive explosives.
3. Persons ordering explosives through traveling salesman must present their license to the salesman. The salesman should state on his order that a proper license has been presented with its class and number.

To All Purchasers of Explosives

We recommend you immediately obtain CERTIFIED COPIES of your license (from the local licensing agent who issued your original license). File one certified copy with our Branch Office from whom you purchase and a Certified Copy with the Railroad Agent where explosives are received.

Companies or persons using explosives in more than one state should obtain a license in each state explosives are to be used and file Certified Copies as above advised.

All sellers of explosives are required to keep a record of sales. A book of standard forms for keeping such record has been prepared by this company and is furnished free on application.

Blasting Ice

Now is the time to be on guard to prevent damage from ice gorges in streams. The best way to eliminate the danger is to practically honeycomb or break up the ice with dynamite at or about the point where the gorge usually or seems likely to occur. By so weakening the ice, it gives easily when the "rush" comes.

Holes about 10 inches in diameter, 30 feet apart across the stream, and 60 feet between rows should be dug through the ice. Into each hole from 5 to 10 cartridges of dynamite tied securely in a bundle should be loaded and primed with an electric detonator. Dynamite should be allowed to float just under the ice, and bundle tied to a stick laid across the hole to prevent being lost.

It is best to fire several holes at a time electrically, but caps and fuse can be used if electric firing is not possible.

If gorge has actually formed, honeycomb in below it as above described. Place a heavy charge at center or weakest points under the ice if possible, and fire. To break large gorges may require anywhere from 100 lbs. to 2000 lbs., according to size.

Raise a Pig

THIS year everyone who has a bit of land should raise a pig—as many more as posssible. On every farm, large and small, on the small suburban estate, even in the city backyard, there is room to raise enough pigs, in the aggregate, to entirely put an end to the present pork shortage, which, according to government reports, is rapidly increasing.

As a rule, a pig can be raised on what is thrown away by the average family, together with what it can grub for itself. It amounts then to converting waste material into valuable food products, at practically no outlay for labor and, on the basis of present pork prices, at a very considerable profit.

Now is no time for being over-finicky. A pig, properly raised, is no more objectionable than a cat. One is a producer—a direct assistance in winning the war; the other is a parasite that serves no useful purpose whatever. We are limiting our industries to essentials. Why not apply the same rule to our domestic economies?

Many towns and cities have already suspended ordinances prohibiting the keeping of pigs. All others should do likewise. Our duty to the nation is clear.

On farms hog production can, and must, be greatly increased. When labor conditions prevent the raising of crops requiring a large amount of hand labor, hog raising fits in admirably. The same applies to land that is partially cleared. Much of the feed can be furnished by easily grown pasture crops that can be harvested by the hogs themselves.

At the present time, thousands of immature hogs are being marketed every day. At the same time we have a great surplus of soft corn, which is good only for feed purposes. Both represent a great economic loss to the nation and a considerable financial loss to the farmer. By keeping the immature hogs on the farm and feeding them on soft corn, they would soon develop into standard animals and bring very satisfactory market prices, with profit to the farmer and a substantial increase in the country's pork production.

The 1917 corn crop exceeded that of 1916 by 500,000,000 bushels. Even making allowances for the corn that will be used for flour to make up the wheat shortage, there is an increase of over 950,000,000 bushels of cereals of all kinds available for feed over 1916. This tremendous surplus ensures an adequate supply of feed and also reasonable prices for those who must purchase grain.

If we do not take energetic steps to increase our pork production, we will have a still more acute shortage of pork products, and even higher prices for hams, bacon, and lard will prevail.

We have the remedy in our own hands—Raise a Pig!

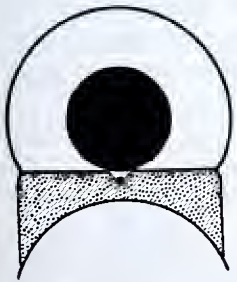
Sights and Sighting

THERE have been great advances in the kind of sights used on sporting and military rifles, from the old style arquebuse fired at point blank range to the modern high power rifle effective at a mile or more.

The old muskets and rifles were minus any sights at all, or at the best a very crude knob on the front end of the barrel served as a front sight. A rear sight was an unnecessary ornament, for the range of the guns was so short that all shooting had to be done at point blank distances. As firearms were improved and better powder was developed, the effective range was increased to such an extent that the crude sights had to be greatly changed and made more accurate.

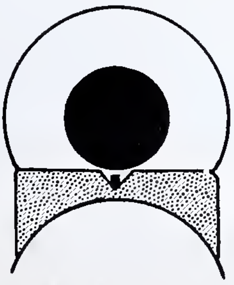
A Modern Ivory Bead Front Sight

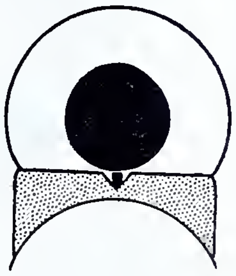
From the fixed, coarse, round knob of a front sight has been evolved the movable knife blade and bead sight tipped with ivory, gold or other material to assist the eyesight of the shooter. Also, from an entire absence of any rear sight at all, there has been developed through the various stages of a crude open notch cut in a raised place on the breech of the barrel, the present refined movable V notch sight with adjustments for elevation and windage. The rear peep sight is another sight development, but the most refined for long range accurate shooting is the delicate telescopic rifle sight.


A Fine Sight

Human muscles, nerves and eyesight are not so mechanical in their actions as a finely finished machine, and are more subject to variations and inaccuracies. To overcome this, and to act as an aid to the human senses, are the chief aims of sight-makers. After all, the only purpose of sights is to enable the shooter to point the rifle so that the bullet will hit the target.

However, the differences in the eyesight and nervous and muscular action and reaction of different individuals, which may be called the "human equation," will cause different final results to be obtained from even the most finely adjusted scientific instrument. This is equally true in the use of the rifle, for different persons will get a different grouping or arrangement of bullets about the target when shooting the same rifle under identical conditions.

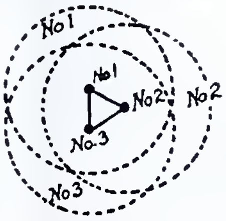

A Coarse Sight


A Full Sight

Again, each shooter may have certain peculiar personal characteristics that may result in the majority of his bullets going to one side of the bull's-eye, even though the sights and other mechanical features of the rifle itself be perfectly co-ordinated.

The first difficulty encountered by the marksman lies in the peculiarities of the human eye. The muscles of the eye unconsciously change the distance of the lense from the retina so that the image of whatever is being looked at is automatically focused upon the retina. This gives clear, sharp and distinct images of the object viewed, but other objects in the line of vision or sight that are nearer or farther away from the eye are slightly blurred or fuzzy in outline, because they are out of focus.

For training the eye and accustoming the muscles to focus so that the least blurring occurs, the method called "triangle of sight" is of excellent service. A loosely filled sand bag is placed on top of a tripod, and the whole is adjusted so that when the rifle is laid across the bag and bedded down so as to remain firm, it is at the proper height for aiming from the shoulder without disturbing or moving the rifle. This is set up about thirty feet away from a wall, and a blank sheet of paper is attached to the wall in a line with the sights. Then a small black circular disc with a pin hole through the center is attached to the end of a slim pointer. The sighter takes an aiming position at the tripod without disturbing the rifle, while an assistant moves the disc over the paper on the wall at command until in the opinion of the sighter it is exactly in the line of sight for a bull's-eye shot. A pencil dot is then made on the paper through the center pin hole in the disc. The disc is then moved, and the sighter steps away from the rifle for a few seconds' rest. The operation is repeated until three points have been made on the paper. Generally these points will coincide fairly closely, but can be connected by lines forming a triangle. The size of the triangle is an indication of the accuracy of the sighting being done, for the larger the triangle, the poorer and more erratic is the sighting. Practice in this manner will train the eye and correct differences due to plain errors in sighting.



The Triangle of Sight Diagram

In this connection there are three general methods of taking sights with the standard open or V sights, and the marksman should select the one which gives the best results for his particular eyesight. One, called the fine sight, consists in taking just the bare tip or minimum amount of the front sight that can be seen through the bottom of the notch in the rear sight. In poor light, the amount of the front sight showing above the rear notch must be increased, which results in what would be called a coarse sight in a good light.

Rifle Mounted With Tang Peep Sight

However, the use of a coarse sight for all types of shooting will result in somewhat erratic sighting on account of there being no mark to show just how much of the front sight shows. The full sight means taking enough of the front sight to fill or come level with the top of the V notch.

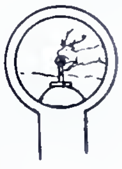
The above applies more particularly to the knife blade front sight with no bead on the top, and the plain straight bar rear sight with V notch in the top of the bar. Where a round bead front sight is used, the rear sight notch is usually of the rounded bottom U form, and the methods of sighting are, according to the amount of front bead showing above the bottom of the notch, a fine bead, a coarse or half bead, and full bead.

A Modern Peep Sight on Rifle

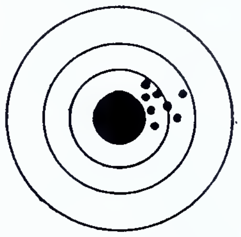
Whichever method is selected, it should be adhered to, for a change will cause the hits to be either above or below the bull's-eye.

In correcting the sights of the rifle to suit individual characteristics, a steady support should be secured over which the rifle can be rested. A sand bag makes an excellent rest, and the firing can be done either from a lying or sitting posture, where rests can also be obtained for the body and arms of the shooter. The target should be about fifty yards away, and the same kind of ammunition should be used as is going to be used in future shooting.

Several shots should be fired, each with equal care, and their grouping observed with respect to the bull's-eye. If a majority of the hits are low, the rear sight notch piece should be raised slightly in the sight

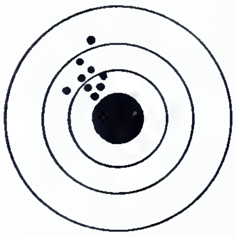

As Seen Through a Peep Sight

frame, which can usually be done without changing the rear sight elevating mechanism for firing at longer ranges. If the hits are high, the notch should be lowered. Should the hits be to the right of the bull's-eye, the front sight should be moved slightly to the right, or the rear sight to the left, in its slot in the rifle barrel. Where the group of hits lies to the left of the bull's-eye, the correction should be made by moving the front sight a little to the left, or the rear sight to the right. When there is a considerable side adjustment to make, part of it should be made on the rear sight, and the rest taken up on the front sight.


A Group of Hits at Right of Target

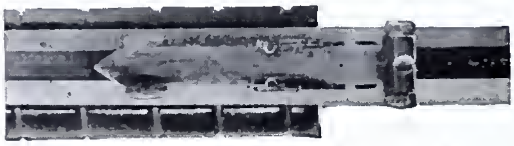
Barrel sights are nearly always put in from the right-hand side of the rifle barrel, hence if for any reason it is desired to take a sight out of its slot, it should be driven from the left to the right.

By the firing of a number of groups of shots, with the sight correction made for each group, the shooter will be able to fit the rifle to his peculiar individual characteristics. This will result in much better scores being made at the target range, and a larger number of hits registered on wild game.


Group of Hits Above and to Left of Bull's-eye

There are various kinds and sizes of notches for open rear sights, varying from the wide-angled coarse open V, which is mostly used for quick snap shooting at running game in a wooded country, to the fine notch in a straight bar for target and long-range work. Each is adapted to its particular field and finds many adherents, for every marksman has his own preference for sights that produce the best results under his handling.

The best modern rear sights have adjustments which move the rear sight to either the left or right to make allowances for windage. At short ranges, the effect of a cross wind in blowing the bullet from its course is not important, but at the long ranges it becomes quite an item, and must be taken into consideration. If the wind is from the right, the rear sight must be moved to the right and vice versa. The amount of offset to allow upon the graduated windage scale depends upon the range, the velocity of, and direction of, the wind. This can be determined only by actual practice, and then depends to a large extent upon the judgment of the shooter.


Open Rear Sight With Windage Screws

Peep sights are generally placed over the breech or on the tang of the rifle back of the breech. They have a small hole through which the eye looks instead of a notch, and increase very much the field of vision. A bead front sight is of better use with a peep sight than a knife blade. Nearly all of the peep sights are screwed solidly to the rifle, and do not permit of being moved sideways, hence sight corrections either to left or right are made on the front sight. They are, however, equipped for range elevation and for windage adjustment.

A Gun Mounted With Open V Sights

The size of the peep hole has a considerable effect on the accuracy of the shooting. A large hole is used for quick snap shooting in hunting, while a very small hole through a large disc is used for fine target work and long-range shooting.

A Delicate Telescope Sight

Telescopic sights may be considered as the ultra-refinement of all rifle shooting. They are quite expensive and are only adapted to long-range shooting, or extremely fine work on the target range. For ordinary shooting in the hunting field, telescopic sights are too cumbersome and too slow, for most game shooting is too much of a snapshot nature for the use of these sights.

Modern Rifle Equipped With Telescope Sights

Nearly any rifle can be fitted with the telescope for fine target work, and the sights removed when the gun is wanted for hunting purposes. The magnification varies from three to five powers in the standard sights on the market, the higher powers being used for long range shooting. The telescope sits high enough above the barrel so as not to interfere with the regular front sight, which is not necessary when using the telescope. Inside the tube are cross hairs or an aperture, whichever is preferable to center on the target. Windage and range adjustments are also provided.

By a proper adjustment of sights to suit the individual characteristics of the shooter and the devotion of some time in conscientious practice, the average rifle owner can develop into the sharpshooter class, which is the goal of all lovers of rifle shooting.

Saving Starch

MANY people take life, and the things pertaining to it, as a matter of course. Few are they who use their leisure moments to learn the "why" for this thing or that. As an example, note an every-day article. How old is the detachable starched linen collar? No doubt, there will be various answers. The right one is ninety-two years. The detached white starched collar of today was invented about 1825, by the wife of a blacksmith of Troy, New York. She cut the first one out with her scissors, and made it, with a shirt to match, and her husband wore it. It did so well that she made some more, and gradually the industry grew.

This brings up another question—When was laundry starch first used? This answer is, away back in the time of Queen Elizabeth, when men and women wore great linen ruffs around their necks, and the fabric had to be stiffened to hold its shape. The Puritans of England denounced ruffs as "devil's finery," and they cursed starch as a "devilish liquor." Even this cursing did not stop the linen collar from becoming popular, and now there is hardly a man who does not wear daily, or at least weekly, a starched collar. We really should have said "who has not worn a starched collar," for many men at the present time are wearing non-starchable collars, because the Great War has changed conditions and circumstances in many lines. Conservation and economy are counted as words of victory, and foods will help. Millions of bushels of potatoes and corn are used every year to make thousands of tons of laundry starch. Think how many people could be given nourishment by that amount of food.

Men who are helping to win the war, even though not in a trench, have come forward with this question, "Why not use the starch that is necessary to keep linen collars in shape for food purposes?" The result has been the adoption, by many men, of the cleanable collar—not the old-time affair known as a "shiner," but a collar that resembles linen collars too closely to be detected.

High-grade cleanable collars look exactly like ordinary collars, have the same up-to-date styles, and the same color. They are made of collar fabric, but the surface is treated to make them instantly cleanable with a sponge or damp cloth. Motorists find them very convenient while on tour. They are being worn not only by substantial citizens who desire to help conserve the corn and potato crops, as well as cut out laundry bills, but by fastidious dressers as well.

Under present conditions it looks as if the cleanable collar was just starting its career. Conservation of starch; muslin; and money. All are in favor of it.

The Honor Roll

3070 Strong

Following is a list of employees of Du Pont American Industries who have entered the Army and Navy in the defense of Democracy. 2966 names have already been reported; this list includes 130 names; there have been 26 duplications and rejections, leaving a total of 3070. The Du Pont Company and their fellow-employees are glad to honor them. On their return to civil life, after their duties as soldiers have been performed, a hearty welcome will await them, and every effort will be made to place them in as good or better positions than they have left.

"Over the top with the best of luck—and give them Hell."

SALARY ROLL

Hopewell

GUN COTTON PLANT

Allen, Porter W.
Cooke, Harvey D.
Gill, George R.
Holt, Robert B.

Telegraph & Telephone

Sullivan, Daniel

Paymaster's Division

Booth, Henry A.

Repauno

HIGH EXPLOSIVES PLANT

Huger, Joseph P.

Engineering Department

Connollee, Alfred C.
Stewart, Herbert H.
Tilden, Van A.
Wright, Ellwood

Chemical Department

Crockett, Wm. G.
Hutton, Ulric O.
Perkins, Granville A.
Reed, Chas. S.

Arlington Works

PY-RA-LIN

Cobb, Fred L.
Daley, V. L.
Friars, Wm.

Harrison Works

PAINTS AND CHEMICALS

Wilson, B. A.

Carney's Point

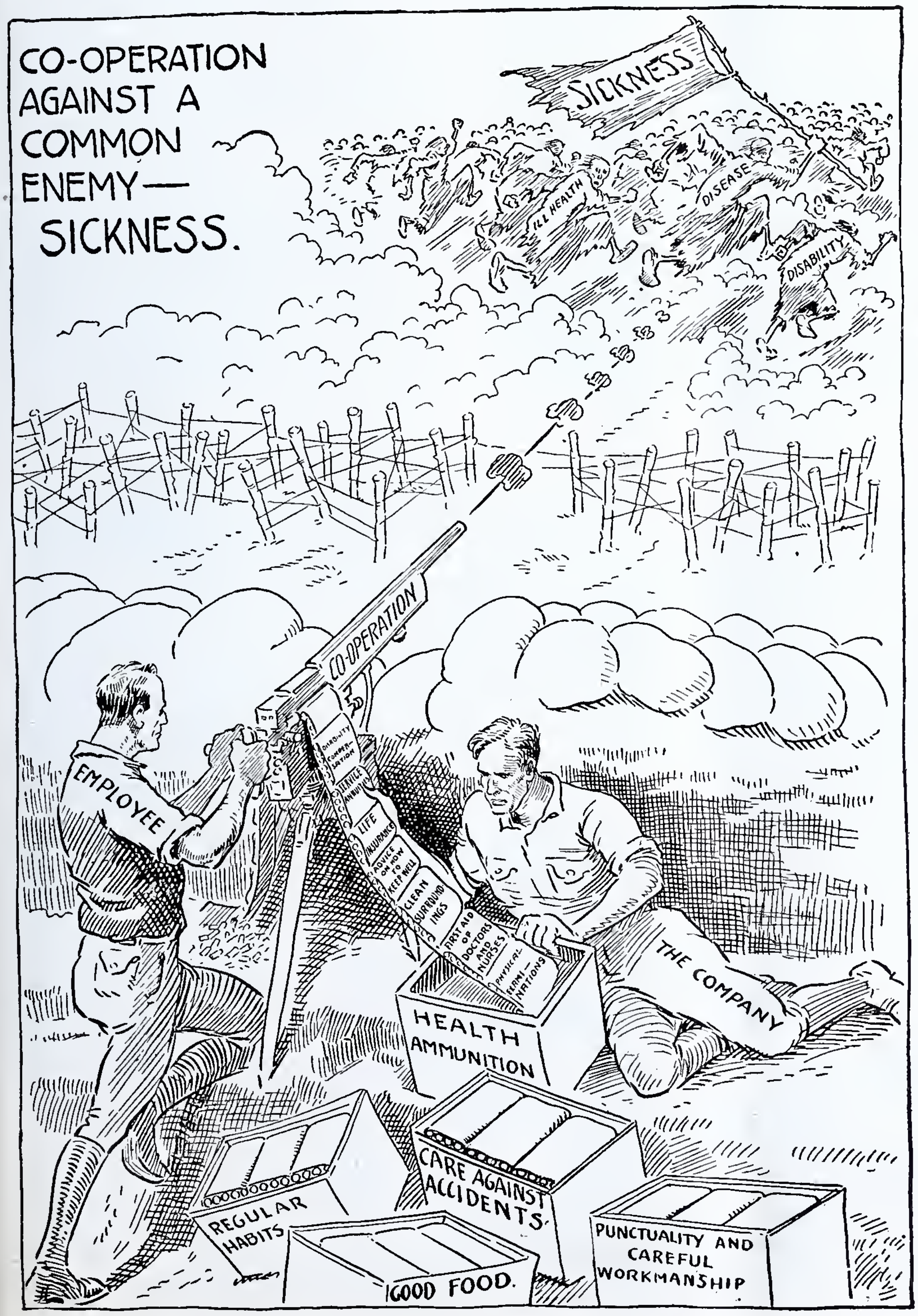
SMOKELESS POWDER PLANT

Coates, E. Osborne
Dodson, Brooke

Haskell Guard

SMOKELESS POWDER PLANT

Griggs, Earl E.



The Circle

During the War Defense Against Disease is as Imperative as Against the Armed Forces

PAY ROLL

Hopewell

GUN COTTON PLANT

Benson, Martin L.
Blackwell, Joshua
Blyth, James
Bonner, Ember
Bowen, Melton
Bower, Albert
Bowman, John
Brown, Will
Boulware, Bunion
Clay, Earl
Condelis, Steve
Conklin, Roscoe
Cooper, William
Davis, Joseph
Eddie, Robert
Edwards, Michael
Elliott, Loss
Ellison, Quinne
Felder, David
Fry, Charlie
Garo, Mike
Groce, Frank
Hawks, Goody
Hawks, Lee
Howard, John L.
Howard, Joseph
Jones, George
Jordan, James B.
Kemp, John R.
Ketchen, William
Mills, Lacy
Morris, James H.
Nyche, George
Parker, James
Patterson, James
Powell, John
Queen, James
Rawles, William
Singleton, George
Singleton, Simuel
Spivey, William
Starling, Troy
Stocks, John
Taylor, George
Taylor, Johnnie
Taylor, William
Tucker, William
Tuggle, Sam
Walker, Bennie
Warner, Walter
Webb, James
West, Carl
Whotener, James L.
Williams, Clarence
Williams, Clarence
Wiltshire, George
Wyatt, Johnnie

Fairfield

Feeney, James
Frederickson, Albert
Rockwell, Wm. A.

Shilzewick, George
Stosoin, Constance
Trouranowisky, John
Tyler, Rodney

Brandywine Shops

MACHINE

Gordon, Thomas
Hainnes, Beni
Kelly, Frank J.
Maloney, Samuel
O'Neill, Paul A.

Repauno

HIGH EXPLOSIVE PLANT

Havens, Samuel J.
Munyan, Clinton R.

Carney's Point

SMOKELESS POWDER PLANT

Allen, Frank G.
Bertolett, Edwin
Caluppett, J.
Canary, Clarence E.
Carlberk, Philip
Cavanaugh, F. W.
Collins, John
Eckstine, John R.
Fox, John
Franz, Herbert
Greshuk, John
Hammer, H.
Hanan, James
Hernes, Harry J.
Herdman, Arthur
Jackson, Wilbert
Keene, Patrick
Kelly, Harry J.
Kenney, Edward F.
Love, Calvers B.
Roberts, Emmett
Rouck, Clarence V.
Schatz, Oliver
Sesco, William
Sibley, Clarence C.
Smith, Eugene
Starkey, Jacob
Sullivan, Alfred F.
Wilson, Fred
Wilson, George
Yoano, Alfonso
Zoffer, Henry
Zolwarsky, M.

Du Pont

HIGH EXPLOSIVE PLANT

Natucci, Ray
Ponton, William R.
Stafford, Robert

Harrison Works

PAINTS AND CHEMICALS

Rafferty, Peter

Corrected to Record of February 8, 1918.

From One of the Boys

GENTLEMEN:—To-day, on arriving home on a furlough, I was agreeably surprised to find a copy of your splendid magazine and to find my name on the Honor Roll of Carney's Point plant. It did me good and cheered me up to know that my fellow workers and employers are thinking of the boys who went.

I am still on this side, but am busy doing my bit. I have met but one of the boys and he had been away too long to have any news from the plant.

An item of importance is that I married the day after my enlistment in the navy.

Hoping to see more of the roll, I am, as ever,

Yours truly,
LEMUEL B. MILLER, JR.

Game Sanctuaries and Conservation

Dr. Joseph Kalbfus, Secretary Game Commission of Pennsylvania

I BELIEVE I have the unqualified endorsement of every member of the Game Commission of Pennsylvania in the declaration that we are protecting and trying to increase game—both animals and birds—so that they may be killed by sportsmen, to the greatest number possible, considering the future of the species, and not simply to be looked at or photographed.

To secure an increase in game, we believe that the future of many kinds of game in this State depends upon the enactment and strict enforcement of drastic laws, because we are in touch with existing conditions, and know the need for immediate energetic action if our game birds are to be perpetuated, much less increased.

We realize the many and varied benefits that come through hunting, and are doing our best to advance the interest of sportsmen we represent. We hold that hunting is a national necessity, not simply recreation or a waste of time. We believe that the presence of game in any State according to its quantity and variety is an asset greatly to be prized.

The presence of game is an incentive to outdoor exercise that means better health, and, therefore, better citizenship for many. The man who hunts acquires a knowledge of the territory covered, of the flora, of the fauna, of the waters, of the minerals, of the general topography and of the people, that can be acquired to the same extent in no other way. We further believe that the ability of the hunter to traverse the woods, the fields, or the waters of this State, either by day or by night, to camp and to shoot straight, make him with limited discipline and drill the equal of any regular on the face of the earth!

Furthermore, not only does the quantity of game taken constitute a very considerable portion of the meat supply in various homes, but the value of the lifework of birds protected continuously is an aid to the farmer and the fruit grower that makes the profitable growing of his crops possible.

In this State every cent used for the protection of game and wild birds, for the payment of bounties, for the purchase and releasing of game for propagating purposes, for the creation of game sanctuaries, for the feeding of game during the winter-time, as well as for all other needs of the Game Commission, comes from sportsmen through the resident hunters' license. Even the farmer, who derives the most benefit from the work of birds, does not contribute one cent to their benefit unless he goes hunting on lands other than the lands he resides upon and cultivates or lands adjacent, for our law permits a farmer and his family to hunt on these lands without a license.

We know what sportsmen are doing, and in turn we are striving to do all in our power to benefit these men through the increase of game to be killed. Just how we can best secure that increase is the question.

In this State, after years of careful consideration, we have concluded that wild turkeys, ruffed grouse, quail and woodcock, and certain animals, could not be successfully reared in captivity—at least not in numbers or at reasonable expense. About twelve years ago we, therefore, turned to the idea of a public game sanctuary, or City of Refuge, and I will devote this article to that subject, believing from experience that such a sanctuary is the true solution of our problem.

Cities of Refuge

Under the laws of this State we have authority to create game preserves or sanctuaries either on lands owned by the State, or on privately owned lands through lease.

The lands designed for such purpose are selected considering the food supply, the water supply, and the topography of the land. We know that the snows of winter usually disappear first on the steep hillsides of a southern exposure, upon which our game animals that graze may find grass, and our birds the gravel and sand necessary to their well being. Large evergreen timber and deep ravines are

Liberating Elk to Restock the Sanctuaries found beneficial because of the shelter they afford from cold and storm.

Our preserves are laid out considering the possibility of travel around them, and are of no fixed form. As they are now created, they are each one about nine miles in circumference, and inclose about five square miles, or 3,200 acres. We consider a tract of this size large enough for the purpose intended—that of providing safety and food and peace and rest to game creatures that may retreat to its confines—and not too large, as are some of our national preserves, to permit animals to breed and live and die in them without benefiting any one.

Our preserves are surrounded by an open space from ten to fifteen feet in width, from which the underbrush has been cut. This is known as a fire-line, because over this line we travel to meet and extinguish occasional forest fires. On the inner side of this fire-line is stretched, about waist high, a strand of wire as thick as a telegraph wire, to mark the boundaries of this fixed area, and to give notice that it is more than an ordinary tract of land.

Along the wire at intervals of a hundred yards or so we have posted notices printed on cloth, calling attention to the fact that the wire encloses a state game preserve, upon which no hunting by any person is permitted at any time, and asking those who read to keep out and help us to keep others out. Game is not enclosed, but comes and goes at pleasure. No dog is permitted on these lands at any time.

Each preserve is under the supervision of a keeper, who lives in a house erected for his use. He has a stable, a horse, and suitable fire apparatus. During the open season he travels around the sanctuary at least once each day. During the closed season he goes around as necessity may require.

It is the duty of this keeper to protect and feed game in the preserve, to kill vermin, and to see to it that any animal mortally wounded by hunters during the open season is captured and delivered to the men who first wounded the animal. The hunter, following his wounded quarry, finding it has gone under the wire, immediately reports that fact to the keeper, who, if he find the game mortally hurt, kills it and delivers it to the hunter to whom it belongs.

Exterminating Vermin

In the killing of vermin—wild cats, foxes, weasels, mink, hawks, owls and crows—we use guns, traps and poison, as we have found all three necessary to our work. We use strychnine because while it will kill any of these vermin or a dog, duck, or blackbird, and many kinds of song and insectivorous birds, it will not kill a chicken, grouse, quail, turkey, pheasant, bear or hog. We have repeatedly fed this poison, in doses sufficient to kill several men, to a common chicken, to quail in captivity and to birds of the grouse and pheasant family, without injury to the birds.

We are informed that in certain parts of Europe, and even in the southern part of our own country, nux vomica, the material from which strychnine is extracted, is mixed with the food of chickens for the purpose of killing hawks. The poison, while not affecting the hen, will kill the hawk that eats the hen. To be doubly sure, however, we use in placing strychnine, a vehicle that neither our game creatures nor wild birds will eat, and one that will not remain on the ground for any considerable length of time.

For foxes and wild cats a sparrow in which a little strychnine has been placed while the bird is yet warm, or a piece of fish or muskrat impregnated with the poison and stuck on a stick or projection of a bush about eight or ten inches from the ground serves the purpose.

For weasels, the body of a rabbit killed by a weasel and saturated with strychnine, dropped into a crevice among rocks, or tied to the end of a stick and stood up in a hollow tree, will prove satisfactory.

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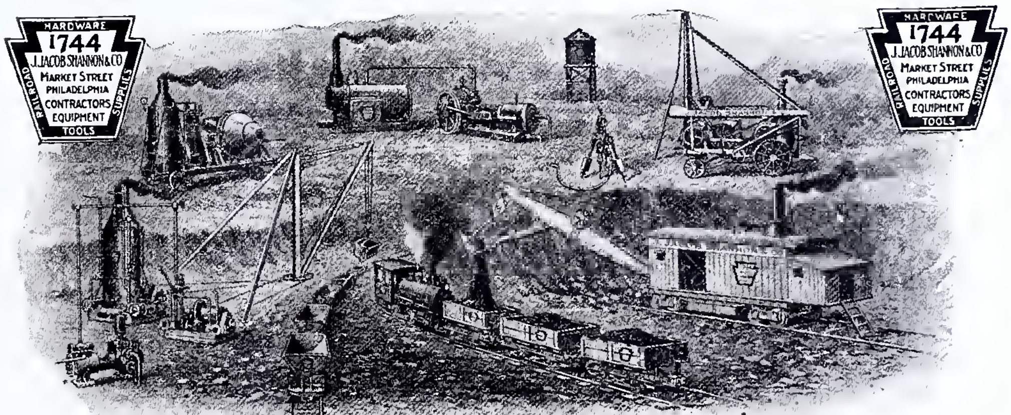

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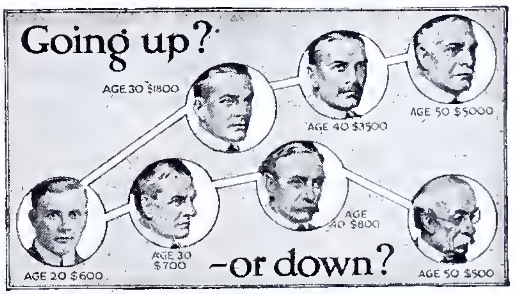

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☐ Commercial Law
☐ BOOKKEEPING
☐ Stenography
☐ Civil Service
☐ Ry. Mail Service
☐ AUTOMOBILES
☐ CHEMISTRY
☐ Illustrating
☐ Farming
☐ Poultry
☐ French
☐ German
☐ Italian
☐ SPANISH

*Name*________________

*Address*________________

I know of as many as five weasels having been killed by one poisoned rabbit.

A piece of dead horse or cow treated with strychnine, and tied or wired in a tree where crows can find it, means great relief from crows. Crows destroy more small game, birds and birds' eggs than any other creature that lives. A young crow in the nest will consume daily two and three times its own weight of food. When young, the crow is fed chiefly on animal food, mainly the young and eggs of other birds—young rabbits, and anything else of this kind the parent birds can gather.

The robin builds its nest on your window sill or near your home, because he fears the robber crow. Even there the nest is destroyed frequently by crows, and we know that the few occurrences of this kind witnessed are nothing as compared with the many that are unseen. Crows may be of limited benefit to agriculture because of the harmful insects and weed seeds they destroy, but we are satisfied that the birds they destroy, if left alive, would do far more good than the crow. We recommend that crows be destroyed wherever that is possible.

Public Sentiment

While we have at this time a number of preserves in working order in this State, I know of but one man who violated the law relative to such sanctuaries. That man killed a deer inside the wire, and claimed that he had not seen either the fire-line wire or the notice. He paid the penalty—a hundred dollar fine—and we believe it taught him a lesson he will long remember.

When these cities of refuge were first constructed there was much declared opposition to the idea. Many thought the intent was to give special privileges to certain individuals, such men being permitted to hunt inside the wire, where the ordinary man could not hunt. When it became thoroughly understood that this was not so, and that no one, under any condition, could do such a thing, sentiment changed very decidedly.

I now frequently meet men who tell me that they were bitterly opposed to this idea in the beginning, but that now the game sanctuary, as created and managed in this State, has their unqualified support. The feeling now is that our efforts mean more to the cause of game protection and game increase than any other thing ever started in this Commonwealth.

The big antlered deer, as well as the small deer, is safe inside the wire, and both are left to serve the purpose intended by Nature.

A Gamekeeper's Home in the Woods

INVESTMENT REGISTRY OF AMERICA INCORPORATED
MORRIS BUILDING, PHILADELPHIA

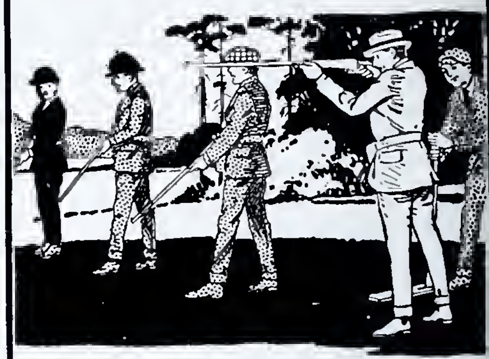
My Financial Secretary

is the term mentally applied by our members when calling on the resources of Investors' Service.

For we are all that, and more to those who use our facilities for analyzing, purchasing, following up and disposing of securities in a thoroughly systematic and scientific manner. The plan is as logical as the relation between lawyer and client.

INVESTMENT REGISTRY
OF AMERICA, INC.
H. Evan Taylor, Pres.
Morris Bldg., Philadelphia
Investment Registry, Ltd.
London, England
Boston Baltimore

PINEHURST
NORTH CAROLINA



Here assemble each year the best shots of the country,—both amateur and professional.

No resort in the South has a better shooting equipment than

Pinehurst
NORTH CAROLINA

United North and South Amateur Handicap Target Tournament

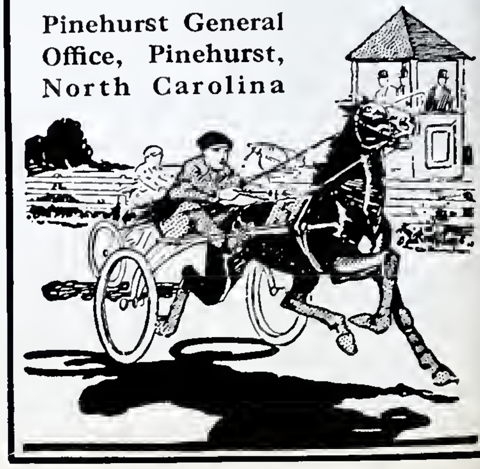
APRIL 8th and 9th, 1918

Added money prizes,—
Squier Money-Back System

GOLF, TENNIS, HORSE-RACING,
RIDING, DRIVING,
MOTORING, RIFLE RANGE

Reservations and tickets from any Seaboard Air Line Agent. Through Pullman from Washington. Write for full particulars.

Pinehurst General
Office, Pinehurst,
North Carolina



Auxiliary Preserves

In addition to the sanctuary or preerve established on wild lands, our last egislature gave the Game Commission uthority to create auxiliary preserves on ultivated lands.

These lands are subject to the same aws controlling the sanctuary proper, xcept in the matter of acreage. The uxiliary preserves are not, however, under he care of a game protector all the time. They range in size from two hundred and ifty to two thousand acres, and may be ocated on ordinary farm lands. Upon hem quail or turkeys can be reared in an bsolutely wild state, to scatter naturally o adjoining lands to the benefit of hunters. They may at any time be trapped by he Game Commission and removed to other sections of the State.

In my next article I will consider Bounty Law, the benefit that may come from such aw, and its abuse.

Wall Paper Makers' Answer

We have received from representatives of the wall paper industry the statement that poisonous pigments are no longer used in the manufacture of high-grade paper, as intimated in an article in our January issue.

We wish in fairness to this industry to call attention here to this statement by the wall paper manufacturers.

When Jail Looms Bright

Mr. Younghusband reached home late for dinner.

"I got caught for speeding on the way home," he explained rather sheepishly. "Have to appear to-morrow morning and get 'ten dollars or fifteen days.'"

Mrs. Younghusband fervently clapped two blistered little hands.

"What a providence!" she cried devoutly. "Take the fifteen days, John! The cook has just left!"—*Harper's Magazine.*

Gardening in the South

Farmers' Bulletin, Number 934, "Home Gardening in the South," is just off the press. It contains much valuable advice to the Southern gardener, and may be obtained free from the Division of Publications, United States Department of Agriculture, Washington, D. C.

War Business Demands

Urgently the Best Possible Method of Industrial Management

It is of the utmost importance that you analyze your fuel and power costs, the equipment of your plant, the proper routing of your product and the welfare of the human element.

Knowledge of the facts must increase efficiency and means better business results.

We can assist you in effecting a saving and reducing operating costs.

P. C. PHILIPP ENGINEERING CORP.
Consulting, Industrial and Utility Engineers
Real Estate Trust Building PHILADELPHIA

INTERNATIONAL MOTOR TRUCKS

Low Cost Hauling

A few years ago some of the biggest, most careful business concerns in this country bought International Motor Trucks, put them to work, and then watched them.

Today those same concerns and many others who saw the tests made are buying

International Motor Trucks

as regularly as additional trucks are needed. Some of them are standardizing their equipment with Internationals—buying nothing else.

The reason? International Motor Trucks do their work well and at low cost as compared with any other kind of hauling equipment, horse or motor.

Do you want any better reason than that?

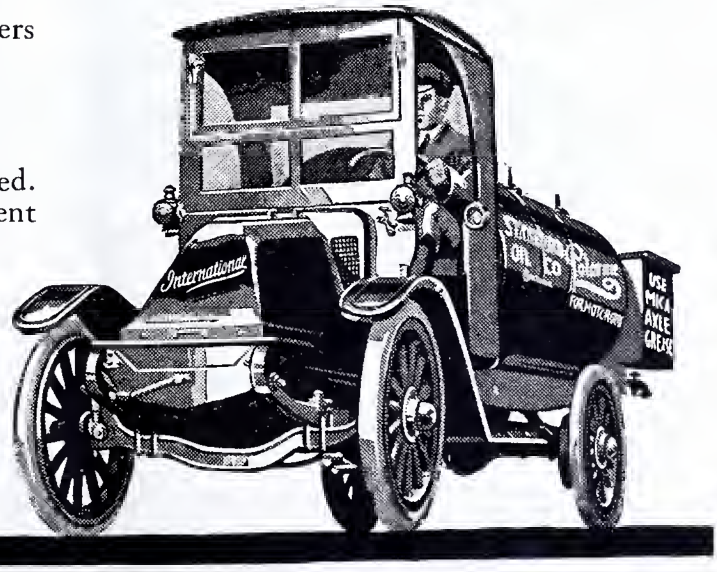
LOOK FOR International ON THE HOOD
A MARK OF QUALITY AND AN ASSURANCE OF SERVICE

Chassis sizes, 1500, 2000, 3000 and 4000 pounds capacity.

Chassis prices, $1450 to $2550, cash f. o. b. factory.

Bodies suitable for every business.

International Harvester Company of America
(INCORPORATED)
Chicago U. S. A.



DU PONT AMERICAN INDUSTRIES

For the convenience of buyers considering the purchase of any Du Pont product, and desiring specific information, this coupon is printed. Upon receipt, it will be forwarded immediately to the proper office for attention.

Fill in, Cut Out and Mail This Coupon

Date..

Sales Promotion Division
E. I. du Pont de Nemours & Co.
Wilmington, Delaware

EXPLOSIVES

- ☐ Farm Explosives
- ☐ Blasting Supplies
- ☐ Industrial Dynamites
- ☐ Blasting Powder
- ☐ Permissible Explosives
- ☐ Road Building
- ☐ Clay Mining
- ☐ Land Clearing
- ☐ Tree Planting
- ☐ Charcoal
- ☐ Wood Pulp
- ☐ Saltpetre
- ☐ Refined Nitrate of Soda

PAINTS

- ☐ Town and Country Paint
- ☐ Colors in Oil
- ☐ Vitrolac Varnish
- ☐ Vitrolac Stain Finish
- ☐ Flowkote Enamel
- ☐ Dulite for Mills
- ☐ Antoxide Iron Paint
- ☐ Shingle Stain
- ☐ Auto Finish
- ☐ Sanitary Wall Finish
- ☐ Bridgeport Standard Paint
- ☐ Wheeler's Wood Filler
- ☐ Bridgeport Wood Finishes
- ☐ Smokestack Paint
- ☐ Floor Varnishes
- ☐ Floor Paints
- ☐ Enamels
- ☐ Concrete Paint
- ☐ Marine Paints
- ☐ Industrial Paints
- ☐ Railway Paints
- ☐ Ferro-Keep (Metal Paint)
- ☐ Barn Paint
- ☐ Wagon and Carriage Paint
- ☐ Auto Paints and Enamels
- ☐ Decorative Stains
- ☐ Varnishes
- ☐ Wire Screen Paint
- ☐ Japans
- ☐ Shellac
- ☐ Red Lead

SPORTING POWDERS

- ☐ Hunting
- ☐ Trapshooting
- ☐ Black Sporting Powder
- ☐ Smokeless Powder
- ☐ Hand Trap
- ☐ Rifle Smokeless Powder
- ☐ Pistol Smokeless Powder
- ☐ Resort Shooting
- ☐ Shooting in Colleges
- ☐ Shooting on Boats

CHEMICALS

- ☐ Acids
- ☐ White Lead
- ☐ Alums
- ☐ Lithopone
- ☐ Litharge
- ☐ Rubber Makers White
- ☐ Dry Colors
- ☐ Pulp Colors
- ☐ Salt Cake
- ☐ Barium Chloride
- ☐ Distilled Water
- ☐ Bronze Powder
- ☐ Bronzing Liquids
- ☐ Wood Lacquer
- ☐ Metal Lacquer
- ☐ Waterproof Cement
- ☐ Py-ra-lin Enamel
- ☐ Pontar
- ☐ Pontoklene
- ☐ Pitch
- ☐ Pegamoid Aluminum Paint
- ☐ Mantle Dips
- ☐ Leather Renovators
- ☐ Ether
- ☐ Parlodion
- ☐ Nitre Cake
- ☐ Creosote
- ☐ Shingle Oil
- ☐ Pyroxylin Solutions
- ☐ Benzol Products
- ☐ Carpo (Metal Paint)

- ☐ Carpolene (Wood Preservative)
- ☐ Wood Oil
- ☐ Dead Oil
- ☐ Belt Cement
- ☐ Household Cement
- ☐ Blanc Fixe
- ☐ Solvents
- ☐ Leather Substitute Solutions
- ☐ Split Leather Solutions
- ☐ Patent Leather Solutions
- ☐ Coke
- ☐ Belt Cement

PY-RA-LIN

- ☐ Py-ra-lin Toilet Goods
- ☐ Challenge Cleanable Collars
- ☐ Novelty Sheeting
- ☐ Transparent Sheeting
- ☐ Py-ra-lin Rods and Tubes
- ☐ Py-ra-lin Pipe Bits
- ☐ Py-ra-lin Specialties
- ☐ Brushes
- ☐ Mirrors
- ☐ Combs
- ☐ Toilet Sets
- ☐ Manicure Sets
- ☐ Desk Sets
- ☐ Colored Sheeting

COATED TEXTILES

- ☐ Fairfield Rubber Cloth
- ☐ Rayntite Top Material
- ☐ Motor Fabrikoid
- ☐ Craftsman Fabrikoid
- ☐ Truck Special Fabrikoid
- ☐ Marine Special (U. S. Standard)
- ☐ Shoe Special
- ☐ Book-Finish Fabrikoid
- ☐ Fabrikoid Sheeting
- ☐ Home Uses for Fabrikoid
- ☐ Fabrikoid for Baggage
- ☐ Fabrikoid for Upholstering
- ☐ Rug Anchor
- ☐ Hat Sweat Material
- ☐ Buggy Aprons
- ☐ Fabrikoid for Railway Cars

Name........................ Position........................

Your Address (If Personal)........................

Name of Concern (If Company)........................

Address of Company........................

BUSINESS: ☐ Manufacturer; ☐ Producer; ☐ Jobber; ☐ Dealer;
☐ Consumer. (Check which)

What Du Pont products do you sell?........................

If a user, for what purpose does the product checked, or that which you now use, interest you?........................

SPECIFIC QUESTIONS SHOULD BE ASKED IN AN ACCOMPANYING LETTER

DU PONT

DU PONT AMERICAN INDUSTRIES

The Opportunity of the Hardware Trade

The entrance of the Du Pont Company into the paint field means much more than that we are going to sell paint.

It means the beginning of a new epoch in the paint industry.

The same organizing, operating, selling facilities and abilities that have earned for the Du Pont Company unquestioned world leadership in other fields of industry, are being applied in the paint business.

Just as the dealer who represents Du Pont in the explosives field automatically gets the bulk of that trade in his locality, so will the dealer who represents Du Pont in the paint field automatically get the bulk of the paint trade.

We believe there has been too much tin can and too little annual net profit in the merchandizing of paint.

We propose to sell the protective and decorative features of paints, varnishes and finishes, rather than the cans, and at the same time to make the business show a much larger annual net to our dealers.

We offer to the thousands of hardware dealers now selling Du Pont explosives, the opportunity to join us in establishing a new national paint, varnish and stain service.

We want in every city, town and small town a full line agency for

HARRISONS
TOWN AND COUNTRY PAINT

And another full line agency for

BRIDGEPORT
STANDARD WOOD FINISHES

Each line is complete in itself and on the highest plane of quality and reputation. Each is now backed by the organization and resources of the Du Pont Company.

Act Promptly if You Want This Desirable Connection.

In many towns one or the other or both of these agencies are already established.

In other towns we have numerous dealers in other lines, and we are likely to hear from several from the same city or town.

Except in large cities, we do not want more than one Harrison and one Bridgeport agency.

Prompt action will impress us that you are a live wire and probably the man we want.

Please write, stating which line you prefer, and we will promptly lay our plan before you.

SALES PROMOTION DIVISION
E. I. du Pont de Nemours & Company
Wilmington, Delaware

Keeping Qualities of Smokeless Powder

Twenty-two years ago, Mr. H. L. Haskins, of South Bend, Indiana, purchased at that place some shells loaded with 37 grains Dupont Smokeless Powder and one ounce of shot. On recent trial of these shells, Mr. Haskins broke twenty-two out of twenty-five blue rocks, and Mr. Teeple, who was shooting with him, broke all at which he shot. The loads were quick and snappy, and no difference could be distinguished between them and new loads of the same powder just coming from the factory.

If Each Home Saves

One ounce of meat daily, it means 465,000,000 pounds annually.

And one slice of bread, 365,000,000 loaves annually.

And one piece of butter, 114,000,000 pounds annually.

And one cup of milk, 912,000,000 quarts, or the product of 400,000 cows annually.

What Did Solomon Say?

London children certainly get some quaint views of life. An instance of this recently occurred in an East End Sunday School, where the teacher was talking to her class about Solomon and his wisdom.

"When the Queen of Sheba came and laid jewels and fine raiment before Solomon, what did he say?" she asked presently.

One small girl, who had evidently had experience in such matters, promptly replied:

"'Ow much d'yer want for the lot?"

—*London Opinion.*

The Same Old Hours

She was a widow who was trying to get in touch with her deceased husband

The medium, after a good deal of futile work, said to her:

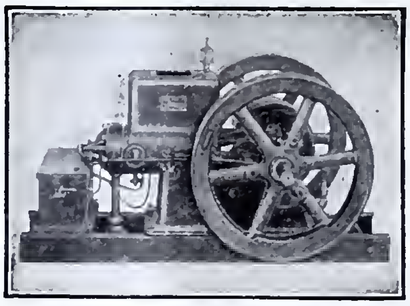
"The conditions this evening seem unfavorable. I can't seem to establish communication with Mr. Smith, ma'am."

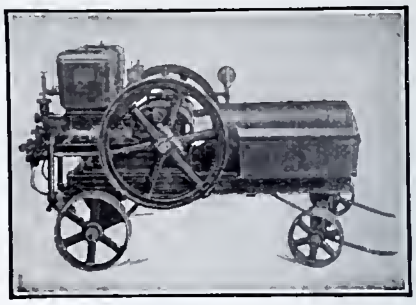
"Well, I'm not surprised," said the widow, with a glance at the clock. "It's only half-past eight now, and John never did show up till about three a. m."

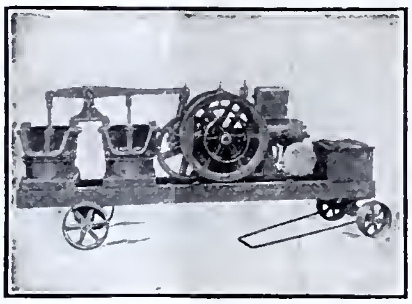
—*Tit-Bits.*

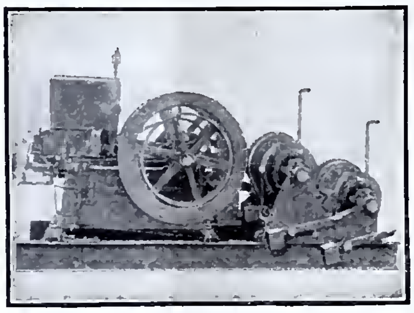
My Tuesdays are meatless,
My Wednesdays are wheatless;
I am getting more eatless each day.
My home it is heatless,
My bed it is sheetless:
They're all sent to the Y. M. C. A.
The barrooms are treatless,
My coffee is sweetless;
Each day I get poorer and wiser;
My stockings are feetless,
My trousers are seatless;
My! How I do hate the Kaiser!

—*Exchange.*


Gas, Gasoline and Oil Engines


Portable Air Compressor


Double Diaphragm Pumps

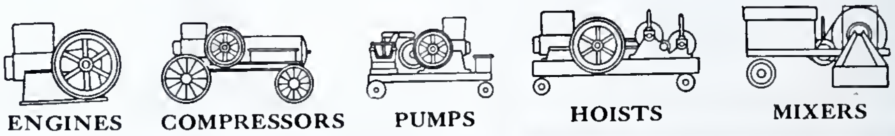

Double Drum Hoist

"SCHRAMM"
LABOR, FUEL and TIME SAVING
POWER UNITS

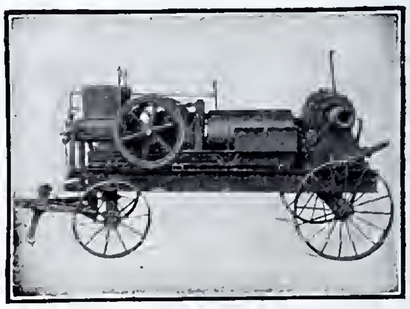
AIR COMPRESSORS, DIAPHRAGM and CENTRIFUGAL PUMPS, DEEP and SHALLOW WELL PUMPS, HOUSE PUMPS, SINGLE and DOUBLE DRUM HOISTS, CONCRETE MIXERS, GAS, GASOLINE and OIL ENGINES

Clip the coupon below, check the machines which interest you, and send for literature, or arrange for trial or demonstration.

Chris D. Schramm and Son, Inc.
Manufacturers



PHILADELPHIA, PA.
Main Office and Showrooms,
709 Arch Street
Branch Offices, Service Stations and Showrooms:
NEW YORK, N. Y., 140 West Street
CHICAGO, ILL., 605 S. Dearborn St.
BOSTON, MASS., 27 School Street
BALTIMORE, MD., 15 E. Fayette St.
Factory, WEST CHESTER, PA.


Compressor-Hoist Combination

________________19____

Chris D. Schramm and Son, Inc.
Gentlemen:—Kindly send us, without any obligation, more information on the machines checked.

☐ Engines, Gas, Gasoline and Oil
☐ Portable Air Compressors
☐ Stationary Air Compressors
☐ Power Pumps
☐ House Pumps
☐ Centrifugal Pumps
☐ Ditch Pumps
☐ Hoisting Outfits
☐ Concrete Mixers
☐ Sawing Outfits

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____

Increase the Fuel Supply

The stump-covered acres have a very important part to play in the nation-wide efforts being made to assure an adequate fuel supply.

In the cities of Detroit and Grand Rapids, homes are warmed by the burning of fragments of stumps blasted out of Michigan's cut-over lands. Stumps have solved the fuel problems of many homes, yielded a good profit to land-owners and the 1918 cleared acres will add to the nation's food supply, which is such a potent factor in helping

To Win the War

Every acre of stumps made into fuel relieves the strain on the coal train, saves standing timber for ship-yards and construction work and adds an acre to the food-producing area of America — the world's granary.

During 1917, National and State Officials made exhaustive field tests of various practical land-clearing methods adapted to cut-over acres. These tests proved that

Red Cross Farm Powder

is the ideal explosive for land clearing, used alone or with pullers.

Turn those stump-acres into money-makers. Do your "bit" to add to the coal-pit. Stumps are "trumps" in this national fuel-saving game. Swap the stumps for the dollars nearby city-dwellers willingly pay for stump-wood.

Place your orders with your local dealer for Red Cross Farm Powder and the required Blasting Supplies. If unable to obtain of him, write to us for name of nearest stock-carrying dealer. Write for FREE BOOKLET—"The Giant Laborer"—Learn how to save labor, improve your farm and make it more productive and valuable to yourself and the nation.

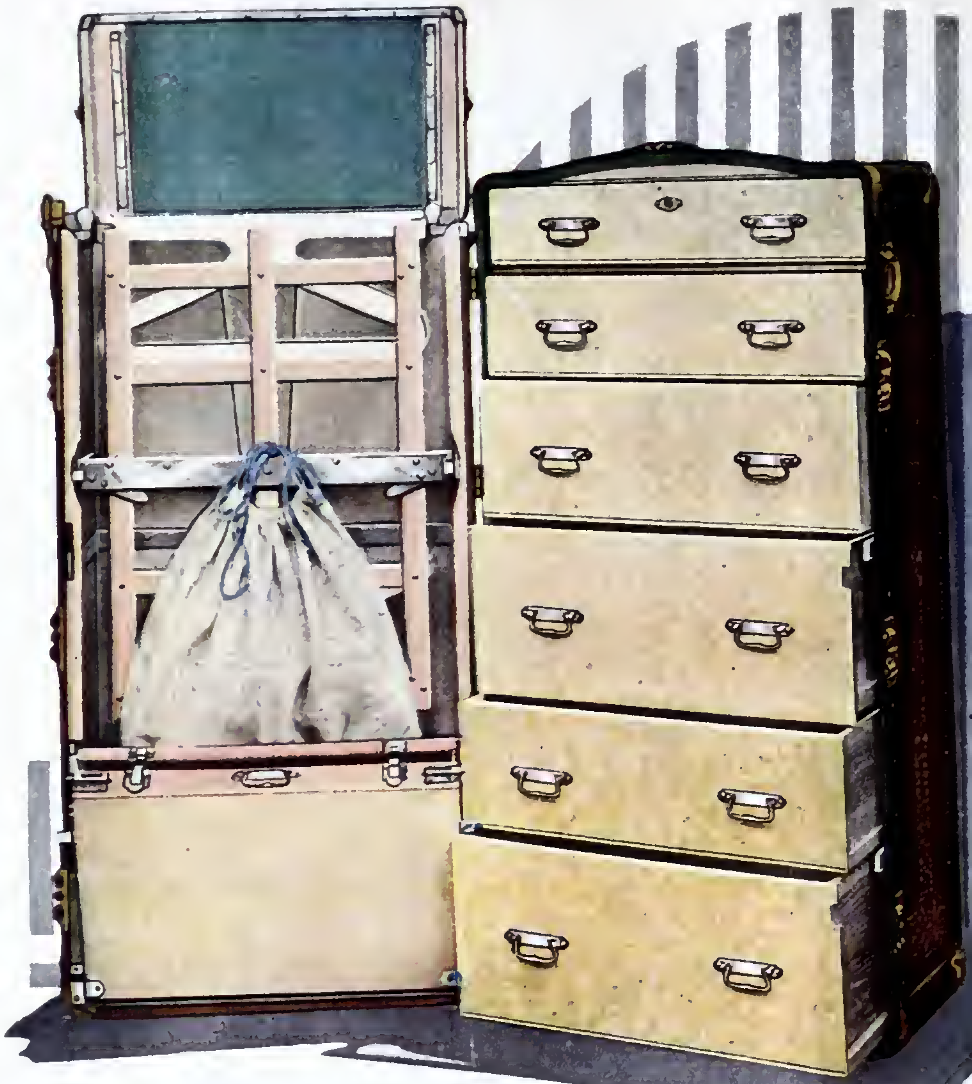
ADDRESS ADVERTISING DIVISION

E. I. du Pont de Nemours & Company

POWDER MAKERS SINCE 1802

Wilmington, Delaware

DU PONT



Belber
TRAVELING GOODS

The TRUNK *of* TRUNKS

The Name

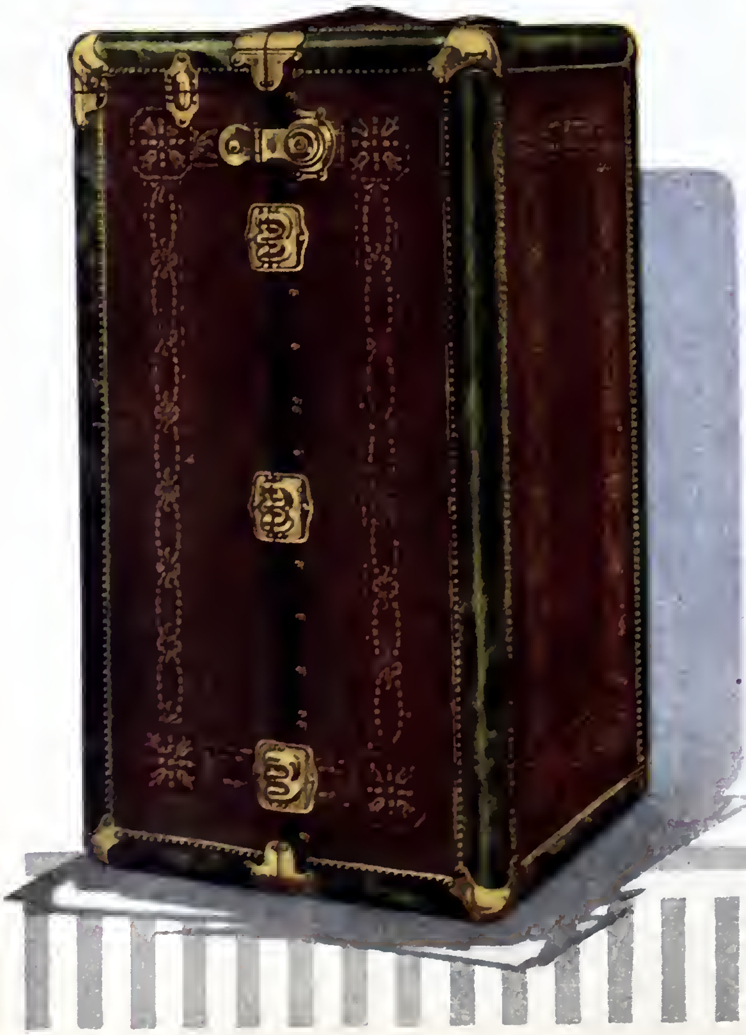
Belber

on trunks, bags and suitcases is significant of honest materials and honest workmanship. It is our guarantee and your assurance of quality. Look for it always.

THE completeness of a wardrobe — the convenience of a chiffonier — the beauty and service of Du Pont Fabrikoid, Craftsman Quality — the trunk-building skill of Belber — combined in a trunk de luxe and doubly guaranteed:

Belber TRAVELING GOODS + DU PONT FABRIKOID

OUTWEAR TRAVEL — CRAFTSMAN QUALITY



It is the final word of two manufacturers supreme in their respective fields. Superb in strength. Exquisite in beauty. Inwardly, a harmony of hand-polished, bird's-eye maple and soft, buff Fabrikoid. Outwardly, a patrician, covered with the best quality Moorish brown Craftsman; bound with genuine rawhide; reinforced with polished brassed steel trimmings.

The finest trunk built — made to *outwear travel*. Constructed of three-ply veneer, doubly reinforced with extra rivets and glued-on heavy duck. A turn of the solid brass tumbler lock and the automatic Belber Boltless Interlocker securely fastens the trunk in three places. Supplied with heavy duck cover for use while traveling.

45 inches high, 22 inches wide, 23⅛ inches deep. Price $300.00

Other sturdy styles from $25.00 to $300.00

BROCHURE UPON REQUEST

The Belber Trunk and Bag Co.

Oxford Street Philadelphia, Pennsylvania